Perspectives from Pharmacists, Prescribers and Patients on Sharing Medication Reason for Use

by

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A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master of Science
in
Pharmacy

Waterloo, Ontario, Canada, 2020

Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Statement of Contributions

Colin Whaley is the sole author of Chapters 1, 2 and 6, which were written under the supervision of Dr. Kelly Grindrod. Three manuscripts for publication are included in this thesis. The work in Chapters 3, 4 and 5 were conducted under grants from the Canadian Institutes of Health Research (CIHR) and Telus Health awarded to Dr. Kelly Grindrod and Dr. Catherine Burns.

This research was conducted at the University of Waterloo by Colin Whaley under the supervision of Dr. Kelly Grindrod. Dr. Kelly Grindrod, Dr. Catherine Burns, Dr. Reicelis Casares Li and Thana Hussein contributed to study design and partricpant recruitment. Dr. Ashley Bancsi, Dr. Reicelis Casares Li, Thana Hussein and Cassandra Sum wrote the interview questions located in the Appendicies and conducted the interviews. Dr. Kelly Grindrod, Dr. Catherine Burns, Dr. Joanne Ho, Dr. Tejal Patel and Colin Whaley contributed to the development of the research questions answered herein. Dr. Kelly Grindrod and Colin Whaley participated in coding and analysis. Colin Whaley wrote the draft manuscripts, to which all co-authors contributed intellectually.

Chapter 3 Citation: Whaley C, Bancsi A, Burns C, Grindrod K. Pharmacists' perspectives on the value of reason for use information on prescriptions and medication labels*. Can Pharm J*. [In press].

As lead author of the manuscripts comprising Chapters 3, 4 and 5, I was responsible for guiding and carrying out data analysis, drafting and submitting

manuscripts. The co-authors listed provided guidance and feedback on draft manuscripts.

Abstract

Pharmacists rarely receive the reason a medication was prescribed, often referred to as reason for use (RFU). Pharmacists can use this information to better counsel patients, support patients in taking medications safely, and improve patient understanding of why they are taking their medications. RFU can also be added to medication labels, giving patients another tool in helping them stay informed and safe when taking their medications.

A total of 60 semi-structured interviews were conducted with pharmacists, prescribers and patients. Twenty interviews were conducted with each group, and were analyzed using thematic analysis to determine the impact of adding RFU on prescriptions and medication labels. Specifically, the impact to clinicians' workflows, on interprofessional communication and patient safety and privacy were examined. Additionally, aspects relating to the logistics of including RFU on prescriptions and medications were considered.

Most participants identified a number of benefits to including RFU on prescriptions and medication labels and ensuring that pharmacists are made aware of RFU. Participants from all groups noted that some patients may not want RFU listed on their medication bottles for privacy reasons, especially for medications to treat sensitive illnesses. These results indicate a need to ensure all members of the

healthcare team are informed about why a medication is being taken, and to support patients in taking their medications safely.

Acknowledgements

They say it takes a village to raise a child; I truly believe I've had a whole city behind me.

Firstly, thank you Dr. Kelly Grindrod for taking me on and teaching me what it means to be a mentor, the importance of always keeping the patient in mind, to always stand up for what's right, and for supporting my tenacity. Your dedication, humour and unwavering guidance have been beyond invaluable and truly career-defining for me. Congratulations on infecting me with the research bug and giving me the best start possible down the clinician-scientist rabbit hole. To the rest of my committee: Dr. Joanne Ho, Dr. Tejal Patel and Dr. Catherine Burns, thank you all for sharing your time, talents and wisdom with me, and helping to make this work the strongest it can be. Finally, a sincere thank you to Dr. Kate Mercer for reviewing this work and making sure it is polished and ready for submission.

I would also like to extend a sincere thank you to the staff of the School of Pharmacy and Faculty of Science who made the journey easier, especially Melinda Recchia for always having an open door and welcoming smile no matter how bizarre my concerns. As well, thank you Kim Arnold for your patience, and for sharing your time and skills with the Faculty of Science graduate student community, helping us along in our careers. Thanks also to my new friends, especially Dr. Ai-Leng Foong, Dr. Terry Li, Yichang Huang and Rodrigo Arcuri for always lending an open ear.

This work was supported by the Natural Sciences and Engineering Research Council of Canada (NSERC) Alexander Graham Bell Canada Graduate Scholarship – Master's.

Dedication

This thesis is dedicated to the many, many people who have supported me along the way. You have been my greatest source of strength as I have pursued my degrees, and I only hope I can give to others as much as you have given me.

And to my parents. Thank you for always doing your best for me.

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List of Abbreviations

Abbreviation	Expanded Abbreviation
AIDS	Acquired immunodeficiency syndrome
CPOE	Computerized provider order entry
EHR	Electronic health records
EMR	Electronic medical record
HCP	Healthcare practitioners
HIV	human immunodeficiency virus
HMS	Health management systems
ICD	International Classification of Diseases
IW	Information weighting
MOXXI	*Medical Office of the XXI Century*
PHI	Protected health information
PMS	Pharmacy management system
PRN	As needed
RFU	Reason for use
SNOMED CT	Systematized Nomenclature of Medicine-Clinical Terms
SRQR	Standards for Reporting Qualitative Research
STI	Sexually transmitted infections

The desire to take medicine is perhaps the greatest feature which distinguishes man from animals.

~Sir William Osler, MD

Chapter 1: Introduction

Medications are core to modern approaches to maintaining health, with 66% of Canadians aged 40-79 using at least one prescription medication in the last 30 days according to the Canadian Health Measures Survey (2016-2017).(1) Despite the number of prescriptions used to treat most medical conditions, research has demonstrated that only around 50% of patients with a chronic condition take their medication in accordance with their prescriber's recommendations.(2,3) In Canada, it has been estimated that improper medication use accounts for up to 25% of hospital admissions.(4)

In Ontario, prescribers are not required add the reason for use (RFU), or indication, for a medication on prescriptions.(5) As a result, to obtain an RFU for a prescription, the pharmacist must either use their professional judgement and guess, ask the patient, or contact the prescriber, all of which come with their own set of concerns.(6,7) Additionally, patients themselves may be unaware of their medications' RFU, especially older patients who take multiple medications to manage chronic illnesses.(8) Lack of awareness of RFU can lead to patients being confused about why they are using a given medication, and ultimately result in lower adherence.(9)

In Ontario, when prescribers include the RFU on prescriptions, they typically do so by writing it in the prescription instructions, on a "case-by-case" basis.(5) Electronic medical records (EMRs), which are used for storing patient information and producing prescriptions to be sent to pharmacists, sometimes have functions that allow prescribers to include the RFU, but these can be cumbersome, are not often used, and do not automatically include this information in the prescription sent to the pharmacy.(10)

Additionally, there is debate between physicians in terms of how to present RFU.(11) Some physicians suggesting using scientific terminology, which would need to be interpreted by pharmacists during their consultation, and others recommending giving RFU in layperson terms, which may be easier for patients to understand without pharmacist intervention.(11) Other options have been suggested for communicating RFU as well. International Classification of Diseases (ICD) codes could be included on the prescriptions, ensuring both prescriber and pharmacist are able to precisely interpret the RFU. ICD codes take the form of three to seven-character codes. However, ICD codes may be prone to error when entered into a computer system to look up the code's meaning.(12,13)

After pharmacists receive RFU, it can also be included on medication prescription labels for use by patients.(11) This location is well suited because it is always attached to the original prescription bottle, and thus patients will have RFU information available to them, versus the information they remember, or that was provided on a separate paper.(14) Having access can improve patient understanding of their medication regime, thusly improving medication safety and adherence.(11)

Including RFU on prescriptions can also benefit other prescribers. Patients are often asked to bring medications in their original bottles to specialist appointments or when checking into a hospital.(14) The inclusion of RFU on medication labels could additionally allow the non-prescribing physician to verify they have an understanding of why a patient is taking a specific medication, and in a hospital setting to understand what medications have been used thus-far to manage a particular illness.

Adding RFU to prescriptions and medication labels could help support the safe and effective use of prescription medications but requires a number of stakeholders to agree to

share it.(9) The objective of this thesis was to investigate the perspectives of pharmacists, prescribers and patients with respect to the addition of RFU on prescriptions and medication labels. This was done through semi-structured interviews and using thematic analysis.

Chapter 2: Overview and Literature Review

This section provides an overview of key terms and concepts relating to medication use in the context of RFU, including health informatics, adherence, and medication indications, as well as a review of the current literature pertaining to RFU.

2.1.1 Health Informatics

Health informatics refers to the use of communication and information systems (ie, computers) to enhance individual and population health outcomes, specifically by targeting knowledge and information gaps within healthcare systems.(15,16) Health informatics includes the study of the health information technology used by clinicians to access patient and medical information.(17) Different clinicians use different tools to access this information, which are summarized in Table 1.

Table 1: Types of information systems(17)

Electronic medical records (EMRs)	Pharmacy management systems (PMSs)	Electronic health records (EHRs)	Health management systems (HMSs)
· used by prescribers and clinical staff · used to access and add information about a patient seen in practice · located in a single practice, health team or hospital	· used by pharmacists and pharmacy staff · used to manage medications and prescriptions · located in one or a network of pharmacies	· used by various clinicians · contains similar info to an EMR, and can also include test results and lab values from external labs · contains information on	· broad term to refer to EMRs, PMSs and EHRs

Electronic medical records (EMRs)	Pharmacy management systems (PMSs)	Electronic health records (EHRs)	Health management systems (HMSs)
		patients from a given region	

Current electronic health record (EHR) workflows for ordering medications include entering in the medication's name, then if the prescriber chooses, adding the indication for the medication. Previous studies have shown that this process is often not followed and reason for use information is rarely added.(10,18) Li et al. previously found that just 15% of interviewed prescribers routinely include RFU on prescriptions, and Salazar et al. found that indications were included on just 7.4% of medication orders in their evaluation of inpatient records in Illinois.(10,19)

Prescriptions are often faxed to pharmacies: this paper-based workflow presents challenges given that pharmacy management systems (PMSs) require the prescription to be re-entered manually into the computer.(18) Despite initiatives like tall man letters for look-alike medication names, or using scientifically incorrect but practically useful unit abbreviations (eg, *mcg* for microgram), entry errors still occur with EHRs.(6,20) Systems and initiatives that promote the routine inclusion of RFU would allow pharmacists to confirm the medication and dosage provided agrees with the indication listed.

2.1.2 Adherence, Concordance, and Compliance

With patient-centered care becoming increasingly prominent in healthcare, the integration of the patient's lived experience, wishes, and values are becoming central to the operation of the healthcare team. Concordance is the understanding that patients and clinicians arrive to with respect to medical choices, which involves the consideration of evidence and patient values.(21) This contrasts with compliance, which places the onus on patients for following prescriber instructions, and adherence, which describes patient's ability and/or decision to follow medication treatment plans.(22) Current literature and clinical best practices suggest concordant relationships between healthcare providers and patients yield most optimal adherence to treatment plans.(22) While PMSs are not explicitly designed to support concordance, they can be used to determine patient adherence — specifically, if patients are taking their medications as instructed. PMSs can be used to calculate the elapsed time in between refills, versus the days' supply provided.

Quantifying patient-centered care is difficult and involves the patient's subjective feelings and beliefs about how their healthcare team communicates with them, respects their wishes, and engages them in the decision-making process.(23) As such, efforts to improve patient adherence by using concordance strategies requires a commitment to patient-centered care and the development of strong, collaborative relationships between patients and their healthcare team.(23)

RFU is particularly relevant to patient adherence and concordance. Notably, pharmacists occupy an important role in medication counselling and review, and are a central figure who educates, reaffirms, and encourages concordant relationships between patients and prescribers.(24) Pharmacists, being the last healthcare provider that patients will interact with regarding their medication, can have a significant impact on patient attitude towards medication use.(25) Affirming prescriber decisions, including RFU information, is key to assuring patients who may be questioning whether to take their medications.(25)

2.1.3 Medication Indications

Indications are the basis on which an intervention or procedure is used, and lead to the determination of goals which overarchingly include the prevention, cure and care of illness and injury.(26,27) Separately, diagnoses are particular medical conditions, comprised of a collection of signs and symptoms.(28) Diagnoses and indications are separate but related pieces of information, which are coded and stored separately within health management systems (HMSs) often using the ICD-10 and Systematized Nomenclature of Medicine-Clinical Terms (SNOMED CT), respectively.(13,29,30)

Indications provide a starting place to determine what information to include as a medication's RFU, as the precise requirements for what constitutes an indication, and by extension RFU, are ill-defined.(9) Kron et al. presented the use of antihypertensives

as a case of how determining a precise indication for a medication can be difficult: “preventing stroke,” “high blood pressure” and “hypertension” are all valid indications for antihypertensive medication.(9) Different constructs can be included under indications, including clinical trial indications, regulatory-agency approved indication, and computerized provider order entry (CPOE) indication. A precise definition for what should be included as RFU for a medication needs to be determined and implemented in an easy-to-use manner within EMRs.

2.2 Key stakeholders in RFU information Flow

Prescribers, pharmacists and patients all have an interest in ensuring that medication RFU is communicated clearly and effectively, to support adherence to medication therapy, accurate counselling and safe medication use. The current routes of communication about RFU, as well as areas where written RFU (wRFU) could be provided are detailed in Figure 1. Previous work regarding the sharing of RFU between these groups are described below.

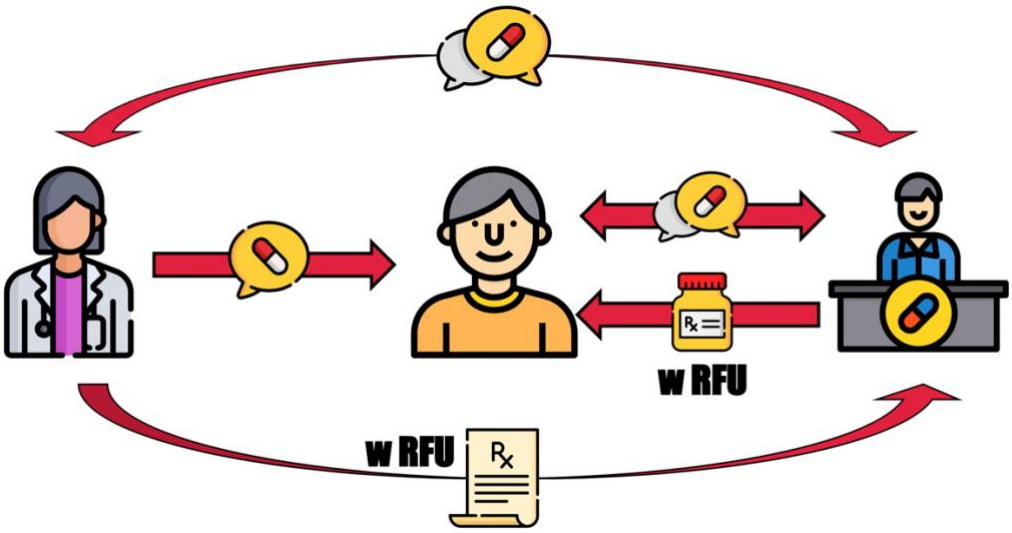

Figure 1, Current RFU information flow. Speech bubbles denote verbal communication, either in person or on the phone. Prescribers (left) verbally explain RFU to patients (middle), who are expected to relay this information to pharmacists (right). As denoted by **wRFU**, prescriptions and medication labels represent opportunities to include RFU in a written format to improve communication about medications. Image credits: doctor, prescription, pill bottle and speech bubble made by Freepik; pharmacist and person made by itim2101, all from www.flaticon.com.

2.2.1 Pharmacists

Pharmacists hold an important role in helping patients manage prescribed and over-the-counter medications, as well as treatment plans. Pharmacists represent the final opportunity to identify if a medication is appropriate, effective, safe, and if the patient is willing and able to take it. Further, pharmacists are responsible for communicating important information on prescribed medication before the patient takes the medication. Thus, from patient safety and medication adherence perspectives, pharmacists have a responsibility to assess why a medication is being used as part of

the dispensing process.(31) Providing pharmacists with access to RFU allows them to identify prescribing errors, reduce call-backs to prescribers, and improve their counselling to patients.(31–33)

Pharmacist counselling has been shown to improve patient adherence to prescribed treatment regimens, however not having access to RFU has been shown to negatively impact pharmacists' ability to provide counselling and education to patients.(9,34,35) Adding RFU to prescriptions would allow pharmacists to have a better understanding of their patients medications, provide more targeted counselling, and ultimately promote safe medication use.

Pharmacists would also benefit from having access to RFU when providing medication reconciliation services, which can take place in hospitals or in the community. Hospital medication reconciliation services have been shown to reduce medication discrepancies, reduce the number of adverse drug events and save healthcare systems money at the time of discharge.(36–38) Community medication reconciliation services ensure complete medication lists, lead to a reduction in healthcare costs, and improvements on outcome measures for a number of chronic illnesses.(34,39)

Finally, associating a prescription with an RFU directly supports deprescribing initiatives, as HMSs can be set to list medications according to why they were prescribed, and would thus allow pharmacists to review medications according to indication, as opposed to traditional chronological views.(9) This functionality, along

with the certainty in knowing why a particular medication was prescribed can allow pharmacists to feel confident in knowing that a particular medication is amenable to deprescription.

2.2.2 Prescribers

Prescribers are the gatekeepers of prescription medication use in the Canadian healthcare system, and can include a number of professions, including physicians and surgeons, dentists, optometrists, nurse practitioners, physician assistants, and in some jurisdictions, pharmacists.(40) To support patients in taking their medications safely and effectively, it makes good sense for prescribers to include RFU on prescriptions to facilitate patient understanding of their medications, counselling by pharmacists and ultimately adherence to prescribed medication regimes.(34)

Despite these advantages, it has been shown that indications are included on prescriptions between 7% and 15% of the time.(10,19) In previous work by Mercer et al., physicians noted that they did not have access to adherence information from pharmacists, who do not routinely communicate this information to physicians.(14) Using EHRs to share information like RFU and adherence information, generated by prescribers and pharmacists, respectively, would facilitate the bidirectional flow of clinically relevant information to these parties.

In Canadian provinces where provincial EHRs contain adherence and lab-value information, these data are not incorporated directly into pharmacist PMSs and

physician EMRs, which reinforces disconnected clinical practices. Facilitating RFU and adherence information is shared between prescribers and pharmacists would provide a benefit to both parties, and may serve to promote RFU addition by prescribers, despite prescriber concerns about increases in documentation.(41,42)

2.2.3 Pharmacist-Prescriber Relationships and Communication

Including an indication on prescriptions has the potential to improve the relationship between pharmacists and physicians. These clinicians are often not co-located, communicate via dated technology (ie, fax, landline) and can experience professional role conflict, which can all lead to RFU not being shared.(43) Mercer et al. used semi-structured interviews to explore how physicians and pharmacists communicate patient-focused information, and the role that EHRs can play in supporting inter-professional decision-making processes.(6) Fax machines were found to be the most common method of communication between pharmacists and physicians, being well-trusted and creating a written record of their interactions.(43) However, the lack of integration between fax machines and EHRs was found to reduce the efficiency of this communication method, as information needs to be manually entered into HMSs. Difficulty in connecting with other healthcare practitioners (HCPs) was frequently mentioned, and both pharmacists and physicians expressed frustration when waiting for other HCPs to respond to messages.

Pharmacists also noted how their relationships with physicians could be strained due to a perceived power imbalance in the physician's favour.(6) This became especially evident in provinces where pharmacists' scope of practice has increased to include prescribing, which could cause "role friction" with some physicians.(6) Taken together, both groups need to develop strategies to facilitate interprofessional collaboration that go beyond information sharing, and extend to professional acceptance, clear, bidirectional communication with physicians and information systems which actively support both.

The importance of clarifying roles, delineating role boundaries, and the influential role of personal relationships between clinicians to facilitate meaningful interactions was stressed as an opportunity to improve the relationships between physicians and pharmacists.(6) Additionally, the value of developing a mutual understanding of where each clinician expertise lays, and the development of systems that support active collaboration to create and reinforce interprofessional partnerships was highlighted.

2.2.4 Patients

While prescribers and pharmacists have important roles in facilitating safe medication use, patients themselves ultimately choose to take their medications. Certain demographic factors have been found to influence patients' decisions to take their medications including: having a mental health illness, patients' understanding of

their medications, age, education, and a being person of colour.(42,44–46) In particular, Garada et al. conducted semi-structured interviews with Australian patients, prescribers and pharmacists, and determined that having RFU on medication labels would make patients "more inclined to" take their medications.(42) Patients in the study expressed concern about adding RFU to medication labels to treat sexually transmitted infections (STIs) and psychiatric illnesses, due to the potential privacy risks of having RFU displayed publically.(42,47)

Adding RFU onto prescriptions and mediation labels would directly support the safe use of medications by patients. Previous research has shown that 13% of patients did not know the indication of at least one of their medications in a primary care setting, and 96% of patients entirely omitted at least one hospital-prescribed medication when asked to provide their medication list.(48,49) As medicine moves increasingly towards patient-centered care, involving patients as partners in care, including through the safe use of medications, is important to ultimately support medication safety.(48) Additionally, as low health literacy has been observed to relate to decreased adherence, the addition of RFU to medication labels may lead to increased adherence.(50)

One research study by Mercer et al. investigated how electronic access to health information via an EHR can be used to facilitate patient decision making.(14) Using semi-structured interviews, patients 18 years or older with at least one chronic illness from Alberta, Ontario, Quebec and Nova Scotia were recruited and asked about their

understanding and perception of EHRs. Patient use of EHRs to access health information was found to be non-existent, even in provinces where provincial EHRs with patient-facing interfaces exist. To that end, the patients were concerned about using EHRs to access their health information and make decisions.

To support their care, patients expressed a desire for EHRs to communicate information between pharmacists and physicians, instead of the onus for information transmission being on them.(14) Patients discussed that EHRs could help them make decisions about their health in the future, as well as understand the rationale behind decisions made by their physicians. These results shed light on how EHRs can better serve the needs of patients.

2.3 Initiatives and research promoting the addition of RFU to prescriptions and medication labels

The existing body of research demonstrates the benefits, disadvantages, perspectives and impact of adding RFU to prescriptions and medication labels from the perspective of pharmacists, prescribers and patients. In addition, there is evidence that supports novel methods of ensuring that RFU is added and communicated clearly to all stakeholders and ultimately improves safe medication use.(18,31) Finally, policy and position papers detailing the value of adding RFU from a number of health organizations exist and are described below.(51,52)

2.3.1 Technological changes to promote RFU communication

Ensuring that RFU information gets added and communicated to pharmacists and patients can be supported by improving the health information systems involved in the storage and transmission of RFU. Some changes proposed to EMRs and PMSs are detailed below.

2.3.1.1 Indications-based prescribing

Schiff pioneered the idea of "indications-based prescribing," where prescribers enter an indication, then select a recommended medication, in a process detailed in Figure 2.(18) The goal of this work was to design a system to promote the routine addition of RFU on prescriptions, thereby enhancing medication safety.(9) By requiring that medications are selected only after an indication is included, indications-based prescribing ensures that prescriptions always include RFU.(18)

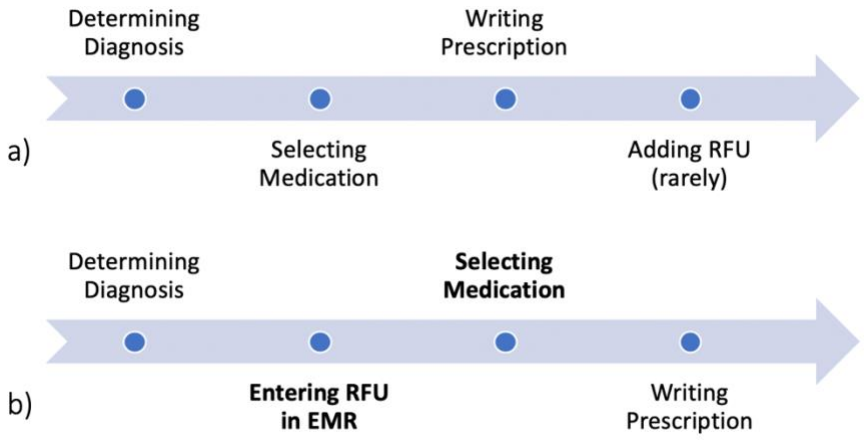

Figure 2, Different prescribing paradigms. a) current prescribing paradigm; b) indications-based prescribing (bottom).

Schiff et al. developed a prototype CPOE incorporating indications-based prescribing, which was tested by 32 prescribers.(53) Their prototype, shown in Figure 3, was shown to result in significantly shorter time and fewer mouse clicks to generate a prescription as well as requiring fewer references to external reference sources across a range of conditions versus participants' preferred existing CPOE. In addition, it was also rated as easier to use versus existing CPOEs.(53) While not currently in routine use in any commercially-available CPOEs, the success of this trial of indications-based prescribing lends to the value of incorporating indications-based prescribing.

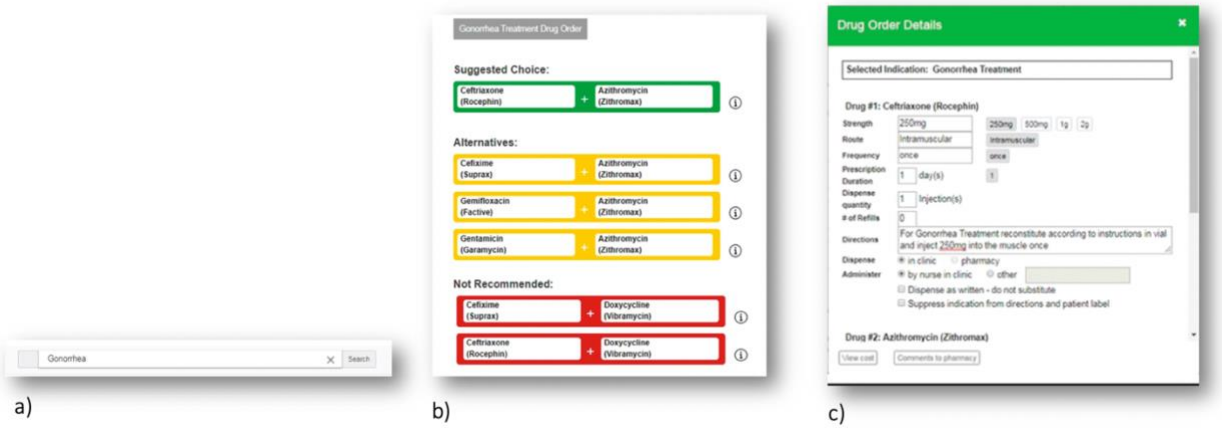

Figure 3, Schiff's indications-based prescribing. a) prescribers enter an indication; b) a list of suggested treatments is presented, factoring in patient characteristics (eg, allergies); c) a drug order is generated automatically, including appropriate dosage, directions and indication. Provided under a CC-BY Licence, © 2019 Garabedian PM et al. JAMA Network Open.

2.3.1.2 Changes to PMS Software

Keresteciogl u et al. investigated the role of PMSs in the interactions between physicians and pharmacists as an area to improve communication between these

parties.(54) Field studies, interviews and talk-aloud explanations of HMS use by pharmacists and physicians were examined, and reasons for miscommunication between pharmacists and physicians and usability issues within the clinical software were identified.

Reasons for miscommunication centered around difficulty in reaching the other provider, a sentiment expressed by both physicians and pharmacists. Additionally, the information disparity between pharmacists and physicians, with the former having access to markedly less information in Ontario due to a lack of EHR access, posed a barrier to effectively managing medications and making informed clinical decisions. Similar to work done by Mercer et al., the primary methods of communication frequently employed by these clinicians pose an additional barrier to developing collaborate relationships. Pharmacists and physicians often fax each other to transmit patient information and to ask questions — a method which does not allow for instantaneous feedback, or confirmation of message receipt. Using fax as a communication method has been noted for its relative inefficiency.(54,55) Pharmacists and physicians both expressed a desire to communicate electronically directly through their HMSs, which would be more efficient, and instantaneous.

Additionally, pharmacist-led medication reconciliation of over-the-counter and prescription medications were identified as a potential source of friction.(54) For example, should an issue be identified where the physician needs to be contacted for additional information, the medication review process cannot continue until the

physician responds, which could take as long as 15 days.(54) This, combined with an unknown response time, means that the entire medication reconciliation process can be unpredictable and lengthy for both patients and pharmacists.

To address these concerns, Keresteciogl u designed a prototype feature to be added to PMSs called a Communications Summary.(54) The Communications Summary includes prescriber information (eg, name, specialty, licence number), a "call box" containing information on the pharmacist's pending and completed medications that need attention from that physician, a panel indicating predicted response times and most likely days to receive a follow-up call, and finally an inbox containing information on the communication history with the physician. This tool was found to be effective in helping predict and understand prescriber response times and was found to aid productivity.

2.3.2 Medication label redesigns to support RFU addition

Hussein et al. investigated the implications of adding RFU onto prescription labels from the perspective of patients.(11) Three major reasons for communicating RFU more clearly in Ontario's healthcare system were identified: to determine RFU for a medication prescribed off-label, to reduce errors so that a medication can be identified both by name and indication, and to increase patients' knowledge about their medications.(11)

Hussein's work identified the best practices in medication label design. The importance of plain language, uniform text orientation, contrast between text and the label's background and a clear, legible, minimum 12-point, font were explicitly noted as contributing factors to the clarity of medication labelling.(11) Semi-structured interviews with patients revealed that the majority of patients rated the importance of knowing RFU as "very important," and patients recommended RFU be written in lay language, using between one to three words.

2.3.3 Policy and position papers surrounding RFU and medication safety

A number of organizations have advocated for the inclusion of RFU on prescriptions and medication labels.(9) These include the National Coordinating Council for Medication Error Reporting and Prevention, calling for a "brief notation of purpose" on prescriptions, (56) The U.S. Pharmacopeia recommending that if RFU is included on a prescription, that it "should be included on the prescription container label,"(51) and the National Association of Boards of Pharmacy "support[ing] legislative and regulatory efforts in the states to require prescribers to include the indication for the medication on all prescriptions and medication orders."(52) Adding RFU on prescriptions and medication labels is complimentary to other medication safety initiatives as well, including the including Canadian Patient Safety Institute's *#ConquerSilence* and *Five Questions to Ask about your Medications* campaigns. These and other organizations add to the pressure to communicate RFU more clearly.(57–59)

2.3.4 Canadian initiatives to support interprofessional communication

Despite the above initiatives, there has still been little advancement in the area of the routine addition of RFU to prescriptions and medication labels in all jurisdictions in Canada and the United States. Notably, in Quebec, the *Medical Office of the XXI Century* (MOXXI) EHR requires the addition of RFU, Figure 4.(60,61) Other Canadian initiatives are detailed below.

Figure 4, Adding an indication using MOXXI. Image reprinted with the written permission of the McGill University Clinical and Health Informatics Research Group.

2.3.4.1 Alberta Netcare

Alberta rolled out a province-wide online EHR in 2008 called *Netcare*, containing protected health information (PHI) of Albertans, including medication records, lab results, hospital discharge reports and transcribed reports.(62) *Netcare* includes a messaging feature where clinicians can securely message other clinicians, based on the EHR software *Epic*.(63) *Netcare* is beneficial for pharmacists, allowing them access to the above data, alerts to medication conflicts, and ePrescriptions, which allows for faster prescription transfer to pharmacists, and eliminates information re-entry.

Much of the PHI is accessible by patients themselves through *Netcare's Personal Health Portal*. Additionally, patients are able to add in information about their health, such as glucometer or pedometer data, allowing them to contribute to their PHI, as well as giving them increased ownership of their health information.(64) Future revisions

will increase information parity with clinicians, providing lab values, discharge reports and records of physician visits to the patients themselves.(65) This information is provided to patients via login with provincial identification, which also serves as authentication for other online provincial services. By allowing patients access to their PHI, they can be able to better engage in the medical decision-making process and make more informed decisions.(66)

2.3.4.2 Canada Health Infoway

Alberta is actively participating in a trial of *PrescribeIT®,* a component of *Canada Health Infoway*.(67) *Canada Health Infoway* is a non-profit organization funded by the Government of Canada to facilitate the development, adoption and use of digital health solutions across Canada.(68) *PrescribeIT®* is a pan-Canada ePrescribing service, allowing prescriptions to be sent between prescribers and pharmacists throughout Canada. The service is proposed to either integrate with existing EMRs, or be accessed through a dedicated application.(69) By 2020, *PrescribeIT®* expects to be operational in Alberta, Ontario and New Brunswick.(70)

PrescribeIT® will benefit pharmacists in similar ways to Alberta *Netcare*, including clinician messaging, eRenewals, and the possibility to eliminate manual entry of prescription details, reducing error.(71) In parallel with *PrescribeIT®*, *Canada Health Infoway* is developing *ACCESS Digital Health*, a pan-Canada EHR, with capabilities similar to *Netcare*, including clinician and patient access to information.(70)

2.4 Summary

There are many potential benefits to pharmacists, physician and patients if RFU is added to prescriptions. By making this information readily available, there will be fewer clarifications between pharmacists and prescribers, allowing for conversations to be more collaborative rather than focused on information gathering. By increasing pharmacists' ability to provide effective counseling, they will be better able to help patients improve their medication awareness, understanding, and ultimately adherence to prescribed treatment regimens. Technological and human-factors aspects present barriers to the routine addition of RFU to prescriptions and medication labels. Technology can make the addition of RFU more convenient, but clinicians still must make the active choice to include it. However, EHRs do have the potential to facilitate the inclusion of RFU on prescriptions by changing prescriber workflow (eg, Schiff's indications-based prescribing, making it mandatory in a particular jurisdiction). Doing so may promote the routine inclusion of RFU on prescriptions.

Building on existing research conducted with pharmacists, physician and patients about improving the communication of RFU, this work identifies additional barriers and facilitators to the inclusion of reason for use, ultimately supporting initiatives to help patients safely take their medications.

Chapter 3: Pharmacists' perspectives on the value of reason for use information

This work is in press at the *Canadian Pharmacists Journal*.

3.1 Introduction

The use of medications is central to the way many illnesses are treated, however have the potential to cause substantial harm if used incorrectly. The global cost of medication errors was estimated to be US $42 billion in 2017.(72) Pharmacists have important roles in helping patients manage their prescription medications, and represent the final opportunity to identify if a medication is indicated, effective, safe, and if the patient is willing and able to take it. Further, pharmacists are responsible for providing any final information on the prescribed medication before the patient takes the medication. Thus, from patient safety and medication adherence perspectives, pharmacists have a responsibility to assess why a medication is being used as part of the dispensing process. In Ontario, prescribers are not required to provide pharmacists with the reason for use (RFU), or indication, for a medication.(5)

Current medication CPOE systems introduce a substantially greater workload when entering a medication's indication. However, this can be easily overcome through a modified design and is the subject of other research.(18) This has led to a low number of prescribers adding RFU to prescriptions. The addition of RFU to prescriptions by prescribers would encourage patients and other clinicians to participate in medication-related decision making, and facilitate stronger collaboration and communication

across the care team.(73) The addition of RFU on prescription labels has also been noted for its ability to improve patient safety and adherence, by ensuring patients are aware of which medications treat which illnesses.(7,74,75) RFU's potential to improve pharmacist workflow was identified in multiple studies, and its current absence from prescriptions was noted as a barrier to efficient patient counselling.(33,76,77) Putting RFU on prescriptions cannot substitute for effective communication skills between pharmacists, physicians and patients, however, as this information can lack nuance and context.(7)

Adding RFU to prescriptions and medication labels presents clear benefits to all healthcare providers and patients, but is still not part of routine clinical practice.(53) This paper explores the potential impact that adding RFU to prescriptions could have on pharmacy practice. The value of this research design is hearing directly from pharmacists about how having access to RFU would affect their clinical workflow and the counselling they provide patients. The objective of this paper was to understand how the workflow of pharmacists would be affected by receiving RFU from prescribers, and to understand their perception of how this would impact their interactions with patients.

3.2 Methods

We used a qualitative approach to ask pharmacists directly how their practice and clinical workflow would be impacted by receiving RFU from prescribers, and how the RFU information should be formatted to ensure its clinical utility.

Semi-structured interviews were conducted with 20 pharmacists in Southwestern Ontario between March and July 2018. Interviews were done as a component of a broader study evaluating the perceptions of physicians, pharmacists and patients on how RFU would impact communication. Semi-structured interviews were used, as this allowed the interviewer flexibility to follow-up on key concepts mentioned by participants.(78) Ethics approval was received by a University of Waterloo ethics committee (ORE# 31591).

A random list of pharmacists who were in active practice was generated using the publicly available database from the Ontario College of Pharmacists website. Pharmacists were faxed a short survey that asked questions about RFU, and asking if they would answer questions about RFU in an in-person interview (Appendix A). Of the 29 pharmacists faxed, 9 responded to the request agreeing to be interviewed. Additional pharmacists to interview were identified via snowball sampling, by asking participating pharmacists if they could refer any colleagues for interviewing. Demographic information can be found in Table 2. Pharmacists were interviewed at a time and location of their choosing, often their pharmacy.

Table 2, Demographic profile of pharmacist participants

ID	Years in Practice	Current Practice
Pharmacist 01	9	Independent
Pharmacist 02	8	Independent
Pharmacist 03	6	Chain store
Pharmacist 04	unknown	Chain store
Pharmacist 05	25	Independent
Pharmacist 06	5	Independent
Pharmacist 07	3	Chain store
Pharmacist 08	1	Chain store
Pharmacist 09	1	Chain store
Pharmacist 10	13	Independent
Pharmacist 11	11	Independent
Pharmacist 12	18	Independent
Pharmacist 13	12	Chain store
Pharmacist 14	13	Hospital
Pharmacist 15	1	Chain store
Pharmacist 16	25	Chain store
Pharmacist 17	1	Chain store
Pharmacist 18	1	Independent
Pharmacist 19	15	Chain store
Pharmacist 20	15	Independent

3.2.1 Data collection

Interviews were jointly conducted by pharmacy and systems design engineering researchers using a semi-structured interview guide (Appendix B). All interviews were recorded and transcribed. In the interviews, the pharmacists were asked a series of questions related to the following four areas: how they were using RFU now in practice; how they currently determine RFU; the impact that the inclusion of RFU on prescriptions would have on their practice; and their willingness to include RFU on prescription labels. The questions were generated by the research team after informal discussion and were finalized based on feedback from CB and KG, as well as an external

researcher. The interviewers probed when the answer to a question was not clear based on the participant's response.

3.2.2 Data analysis

Transcripts were stored and analyzed using NVivo12 for Mac.(79) The engineering team separately analyzed the data, considering the data from pharmacists, physicians and patients, and presenting a model of the pharmacists' decision making, as opposed to a more in-depth analysis of a single group's interviews. Their analyses are published elsewhere.(10) In this paper, the data were analyzed using a thematic analysis approach, as it could capture the common beliefs and opinions of the sample while also recognizing unique experiences and perspectives.(80) An iterative coding process was used, which allowed the themes to develop over the course of the interviews, and ensured that the resulting themes were closely aligned with what participants said.

Two members of the pharmacy research team (CW, AB) coded the first three interviews independently, with each researcher generating a list of codes. They compared their lists and resolved discrepancies through discussion and re-review of the pertinent data. One researcher (CW) analyzed the remaining 17 interviews, adding in new codes as they emerged. The second researcher (AB), who was present at all interviews, reviewed the final code book for accuracy and completeness. Inductive thematic saturation was reached on the basis of no new codes being observed in the

data.(81) While preparing the manuscript, the Standards for Reporting Qualitative Research (SRQR) were followed (Appendix C).(82)

3.3 Results

The analysis identified four major themes. The themes encapsulate pharmacist perspectives on the current state of RFU communication, and pharmacist perspectives on the implications of adding RFU to prescriptions.

3.3.1 Theme 1: Format for adding RFU to prescriptions

The pharmacist participants were asked the format in which they would like to receive RFU from prescribers, if they or the prescribers should be responsible for putting RFU into patient-friendly language, and the ideal format for adding RFU to a pharmacy medication label. Pharmacists generally noted that they would prefer to receive the RFU as text over some sort of diagnostic code, such as an ICD code. Most pharmacists indicated that they were not comfortable with the ICD system. As such, the use of these codes to communicate the RFU to pharmacists is a barrier to pharmacists' uptake of using RFU in this format, as indicated by this participant:

> I would say there's already so much to memorize in terms of [drug] entry. It would be great if the system already had pre-made indications already attached to a drug, and that someone doesn't need to memorize like 100 codes like a grocery store café. Like 853 is broccoli. I think that's kind of like a waste of time. [Pharmacist 17]

Pharmacists expressed comfort with both medical and nonmedical language being used to communicate RFU. They generally indicated that both parties should be responsible for putting the RFU into nonmedical lay-language for the patient. Most pharmacists noted that nonmedical terminology should be used on medication labels, as this information would likely be of highest utility for patients. One pharmacist mentioned that both nonmedical and medical terminology should be included on the label, proposing the medication bottle be used as a tool for helping the patient understand the meaning of some medical terminology:

> If [the medication bottle is for] the patient, I think they should use lay terms with the medical term in brackets, because I think that sometimes healthcare providers still use the medical terms and it's to [the patient's] benefit to know that those things are equal to each other. [Pharmacist 14]

3.3.2 Theme 2: Privacy implications of adding the RFU to prescriptions and labels

All participants respected the need to protect patient privacy when RFU is communicated. Pharmacists, who see themselves and their staff as a part of the circle of care, emphasized the importance of all members of the healthcare team having access to RFU information to provide optimal patient care. All pharmacists indicated health information is as safe with them as with physicians.

> Everyone in their circle of healthcare team should be in the know, so that we can all work seamlessly together. I mean, it's as private with the doctor, as it is with the pharmacist. [Pharmacist 17]

Pharmacists generally indicated more concern with the addition of RFU onto medication labels, as this represents a public display of private health information. For pharmacists, this conflicted with their recognition that patients would benefit from having the RFU included on medication labels. Most pharmacists noted that they would not apply RFU onto a label without consideration of the diagnosis being communicated:

> …if it's a medical condition that might be a little personal and you don't want other people to look at it. For example, a sexually transmitted infection, then I wouldn't necessarily put it on the label. But sometimes if it's for more chronic medications like blood pressure or gout, diabetes, things like that, I would be more willing to put it on the label. [Pharmacist 09]

The above pharmacist indicated the importance of the contextual information surrounding medications. Knowledge like how long a patient has been on a medication and how they are tolerating it can be best determined when there is a positive relationship between patient and pharmacist. Consequently, pharmacists noted that the addition of RFU onto medication labels for some indications should only be added in consultation with patients, and is a choice that must ultimately be left up to the patient:

> …if someone reads a patient's vial and the label indicates that they have depression… that could be a privacy concern, so that would potentially be a concern. So, that might be a conversation that we have with the patients as well. [Pharmacist 20]

3.3.3 Theme 3: Using RFU to assess medication safety

Pharmacists acknowledged the benefits to patient safety when RFU if provided to both the pharmacists and patients in a written format. Many pharmacists noted that their ability to catch errors would be greatly improved with access to RFU. One pharmacist referenced a situation where a patient was prescribed a medication whose name was confused with a different medication:

> …this patient received hydroxyzine instead of hydralazine, and if the doctor had indicated the indication… somebody could easily check the prescription and think, "Okay, this medication was entered wrong." [Pharmacist 15]

This error could have been caught more easily, or completely avoided if the pharmacist was provided the RFU. When there is uncertainty about the safety or appropriateness of a medication, the pharmacist must communicate directly with the physician, which is often a time-consuming task:

> Oh, [the RFU on the prescription] would definitely save time in regards to unnecessary questions back and forth between healthcare professionals. As much as we love to pick up the phone or always talk to the physician, they're not available. [Pharmacist 19]

Another aspect of safety is that pharmacists can use the RFU during medication reconciliation to identify duplications in therapy or errors of omission. One pharmacist highlighted the breadth of information needed to help patients manage all of their medications:

> … we can get bigger picture information like that that's lost between physicians or if [patients] were in the hospital. When they come to the same pharmacy, we have all this information. We have a better picture of everything, and there are things that get missed all the time. [Pharmacist 19]

They summarized the opinions expressed by them and their colleagues as follows:

> [Providing written RFU to pharmacists has usefulness in] preventing errors, providing better healthcare, accelerating time in regards to being more efficient, double-checking with the physician so that the errors won't occur. [Pharmacist 19]

3.3.4 Theme 4: Using RFU to individualize counselling

Pharmacists universally indicated that RFU would be valuable and improve their ability to effectively counsel patients. Counselling involves bidirectional communication between pharmacist and patient, which is impacted by the nature of the diagnosis:

> It's good to know [RFU] so that when you approach your counseling you can be sensitive to the state of mind they might be in, right? …If it's [for] depression, you want to not go over, "Yeah! Hi! How's it going?" … You can just gauge your own counseling technique based on knowing [the indication]. [Pharmacist 02]

Pharmacists currently guess RFU based on the medication and confirm the guess by asking the patient directly. This process can be uncomfortable for some medications indicated for more sensitive diagnoses:

> Obviously, if I have a clear reason for use, I'll just tell them what it was. Then, if I don't have a clear reason for use, I'll say ... For example, an anti-depressant, if they are not forthcoming, for example, [with] the reason for use, I'll say, "Okay, this medication can be used for depression or sleep, and this is the dose you have, so I think it's [for depression]." [Pharmacist 18]

This can lead to an uncomfortable dynamic between the pharmacist and patient. Erroneous assumptions can also occur when determining the RFU for medications with multiple indications:

> I got a patient with… a new dosage of Seroquel, but it was the least dose and he wasn't really cooperative [when] talking. …I told him "probably you're using it for sleep" because it was just the lowest dose… [it's] only when he called [later] and revealed that it's for schizophrenia and not sleep. [Pharmacist 10]

This situation required follow-up with the prescribing physician, as the dosage prescribed was not indicated for schizophrenia. Cases like this could be addressed more rapidly if RFU was provided to the pharmacist.

A male pharmacist interviewed mentioned that this process of verifying RFU in a question format can be difficult for him, especially when working the overnight shift as the only pharmacist available:

> Sometimes when [working overnight shifts, I see some female patients filling] emergency prescriptions. Most of the time ... actually all the time I will ask the patient why they're using it. Sometimes I voluntarily tell them "You're taking this medication for this reason," just to make it easier with them, and they say, "Yes," and that actually creates some confidence between the pharmacist and the patient. [Pharmacist 13]

Here, a clear picture emerges of the pitfalls of prescribers not providing written RFU to pharmacists. Not providing pharmacists RFU can lead to poor patient experience, and the need to guess RFU can result in errors leading to patients receiving inaccurate and irrelevant information.

3.4 Discussion

Pharmacists would directly benefit from receiving RFU, allowing them to assess medication safety more effectively, and to provide more sensitive counselling to patients. In this study, it was clear that RFU is valuable information that is currently missing from pharmacists' workflows. Pharmacists in this study identified several discrete and relevant steps in their workflow where RFU would optimize patient care. This can include the use of RFU to assess the appropriateness of a medication dose, personalize patient education, and prevent look alike/sound alike drug name errors.

This paper joins the few prior studies which have directly engaged pharmacists in conversation on RFU.(73,76) The pharmacists interviewed for this study commented on the privacy considerations of including a medication's indication on the medication label underscore the importance of respecting individual patients' choices when deciding to add them. Despite the increasing body of literature strongly supporting the addition of RFU on medication labels, equal attention must be paid to when the addition of RFU on medication labels may be harmful to patients.(18) The pharmacists

interviewed indicated that RFU should only be added to medication labels while considering the broader context of the medication, including factors such as the sensitivity of the illness being treated by the medication (ie, if there is stigma surrounding an illness), if the medication is being used to treat an acute illness or chronic illness, and if the patient is taking multiple medications.

Many of the privacy considerations raised by the pharmacists interviewed revolved around adding indications to prescriptions and medication labels for medications to treat sensitive illnesses, such as STIs or mental health illnesses. When the topic of privacy was raised, all of the pharmacists readily suggested that consulting on a patient-by-patient basis could clarify if RFU should be added to the medication labels. However, a patient with dementia may not have the capacity to consent to the addition of RFU to their medication label, but this could aid their caretaker in managing their medications. Guidelines for the addition of RFU if the patient is unable to consent its addition on medication labels are needed, along with consultation from people who live with sensitive illnesses.

Pharmacists' desire to receive RFU in a written format aligns with suggested changes in CPOEs to support indication-based prescribing.(9,53) Much work on indication-based prescribing includes the use of drop-down menus in COPEs, as opposed to free-form text entry. This is suggested to reduce prescriber task burden while writing a prescription, however this may not support the use of lay-language on medication labels.(53) Prescribers will need to be comfortable with pharmacists

including their own lay-language interpretation of the RFU on the medication label to facilitate its use as a patient education tool.

The pharmacists' comments are all in agreement with the existing literature on the capacity for RFU to improve medication safety.(18) Comments on how RFU will improve counselling are all rooted in a desire to provide a comfortable environment for pharmacists and patients to discuss medications. Pharmacists indicated that knowing a medication's RFU was especially important for sensitive illnesses and mood-altering illnesses. Psychiatric medications occupy both of these categories and can have multiple indications. Pharmacists would benefit from knowing psychiatric medications' RFUs in particular but should consult with patients before including them on the medication label.

The pharmacists interviewed were all from a similar geographic region in Ontario and were all community pharmacists. This homogeneity means that pharmacists from regions with differing scopes of practice were not captured. The pharmacists interviewed did practice in a variety of settings, including family health team-based practice, chain, and independent retail pharmacies. To improve the trustworthiness of the analysis, a non-clinician researcher (CW) analyzed the data.

These results provide further impetus for the inclusion of RFU on prescriptions, and on medication labels, especially given the benefits to patient safety if RFU is provided on medication labels. Pharmacists are aware of the privacy risks of including this information on medication and are prepared to navigate these concerns in

consultation with patients. Future research will focus on the physician perspective. For physicians to fully embrace this, however, there will likely need to be computer system changes, regulations, and/or incentives put into place to ensure physicians are willing and able to share the indication as part of their daily workflow. Finally, pharmacists are eager to have access to RFU to allow them to provide a comfortable experience to patients.

Chapter 4: Prescribers' perspectives on including reason for use information on prescriptions and medication labels: a qualitative thematic analysis

4.1 Introduction

Many North Americans use medications to treat illnesses and manage their health. In Canada, 66% and in the United States, 69% of adults aged 40-79 used at least one prescription medication in the last 30 days as found by the Canadian Health Measures Survey (2016-2017) and the US National Health and Nutrition Examination Survey (2015-2016), respectively.(1) Depending on the jurisdiction, medications can be prescribed by a number of clinicians, including physicians, physician assistants, nurse practitioners, optometrists, dentists and pharmacists, according to their specialty, scope of practice and appropriate legislation.(83) Prescribers rarely include RFU on medication prescriptions (also commonly referred to as the indication for use).(19) In an analysis of more than 4.3 million outpatient prescriptions issued between 2011 and 2015 from a major academic medical centre in Illinois, only 7% of prescriptions included the RFU.(19)

The addition of RFU to prescriptions can have positive impacts on medication safety, adherence and patient understanding of their medications by helping pharmacists understand medications when dispensing them.(9,24) Despite efforts by prescribers to educate patients about their medications, patients may still lack a clear understanding of why a particular medication was prescribed, which is associated with increased adverse drug events.(84) In the United States, Persell et al. showed that

patients belonging to populations associated with increased morbidity, namely those who are older, less educated, or black, are less likely to know their medications' RFU.(49,83) However, pharmacists who have access to the RFU catch more medication errors, reduce unnecessary contact with prescribers, and reinforce physician education of patients.(33,73,74) Despite these and many other studies showing the value of adding RFU to prescriptions, along with support from various healthcare advocacy groups, prescribers must ultimately choose to add RFU to the prescriptions they write.(52,85)

Much of the literature has focused on technological ways of making the addition of RFU more straightforward, and engaging high-level stakeholders in the value of adding RFU, however no studies have directly asked prescribers for their perspective on the addition of RFU on prescriptions.(9,18) From an implementation perspective, it is critical to understand its potential value for prescribers relative to the perceived impact on workflow.(41) The objective of this paper was to explore physician perspectives on writing medication RFUs on prescriptions and medication labels.

4.2 Methods

We conducted semi-structured interviews with 20 prescribers (2 nurse practitioners, 18 physicians) in Southern Ontario, Canada between June and August 2018. The interviews were conducted as a part of a larger study evaluating how pharmacists, prescribers and patients currently communicate RFU, how policies around

RFU sharing may impact healthcare teams, and clinicians' perceptions on sharing RFU with their colleagues and patients. Semi-structured interviews were used, as they allowed the flexibility to follow-up on key concepts mentioned by participants.(80) Ethics approval was received by a University of Waterloo research ethics committee (ORE# 31591).

Prescribers in AB and KG's networks and were asked to participate in this study. Upon completion, they were also asked if they knew any colleagues who may also be willing to participate in the study. This snowball sampling method was used to gather additional participants. Prescribers were interviewed at a time and location of their choosing, often over the phone or at their clinic. A $150 CAD honourarium was provided in appreciation for their time. Information on participants' demographics, profession, specialty and years of practice was collected, and can be found in Table 3. Additional aggregated demographic information can be found in Table 4.

Table 3, Demographic profile of prescriber participants

ID	Type	Specialty	Years in Practice
Prescriber 01	Nurse practitioner	-	unknown
Prescriber 02	Nurse practitioner	-	9
Prescriber 03	Physician	Family medicine	20
Prescriber 04	Physician	Family medicine	32
Prescriber 05	Physician	Family medicine	30
Prescriber 06	Physician	Family medicine	8
Prescriber 07	Physician	Family medicine	33
Prescriber 08	Physician	Family medicine	1
Prescriber 09	Physician	Emergency medicine	4
Prescriber 10	Physician	Family medicine	29
Prescriber 11	Physician	Emergency medicine	5
Prescriber 12	Physician	Emergency medicine	4
Prescriber 13	Physician	Emergency medicine	4
Prescriber 14	Physician	Family medicine	7
Prescriber 15	Physician	Emergency medicine	5
Prescriber 16	Physician	Family medicine	2
Prescriber 17	Physician	Family medicine	2
Prescriber 18	Physician	Family medicine	2
Prescriber 19	Physician	Anesthesiology	7
Prescriber 20	Physician	Family medicine	2

Table 4, Practice details for prescriber participants

Demographic Type	Demographic Information
Recruitment method	Personal network: 7 Snowball sampling: 13
Practice type	Community health centre: 4 Family health team: 4 Hospital: 7 Independent practice: 5
Practice location	Southwestern Ontario: 14 Greater Toronto Area: 6
Academic appointment	Adjunct appointment: 4 Full appointment: 3 None: 13

4.2.1 Data collection

Interviews were conducted by one pharmacy and one systems design engineering researcher using a semi-structured interview guide jointly developed by the engineering and pharmacy teams (Appendix D). Feedback from prescribers and patients was sought in when developing these questions. Specifically, we used a qualitative approach to ask prescribers the following:

- how their practice and clinical workflow would be impacted by being required to add RFU onto prescriptions;
- how sharing RFU information on prescriptions would impact their relationships with other prescribers, pharmacists and patients, and;
- the perceived impact of having RFU information shared on patient medication labels.

Interviews were recorded and transcribed. In the interviews, prescribers were asked about their current clinical workflow and how RFU fits into it, changes to

workflow as a result of adding RFU, and how adding RFU could impact professional relationships with clinicians and patients.

4.2.2 Data analysis

Transcripts were stored and analyzed using NVivo 12 for Mac.(79) Thematic analysis allowed for prevalent participants' opinions to be expressed while preserving unique perspectives.(80) Iterative coding allowed themes to develop over the course of reviewing the interviews and ensured that the final themes were aligned with what participants said.

Two members of the pharmacy research team (CW, KG) coded the first three interviews independently and generated a list of codes. Differences in coding were reviewed for each interview, and discrepancies resolved code-by-code. Both CW and KG reviewed the remaining interviews and met periodically to review codes and resolve discrepancies, by discussing the rationale for particular codes. Through this process, the codebook was updated as new codes emerged, upon the agreement of both researchers. CW and KG assembled the quotes into larger themes, and the quotes were synthesized into a Framework Matrix using NVivo 11 for Windows. Quotes in the Matrix were reviewed, and representative and divergent quotes were selected for our results. The final analysis was reviewed by a physician researcher to provide additional background and context. Memos were periodically written during the coding process, to facilitate theme generation and refinement. The engineering team separately analyzed the data,

and developed a model of prescriber decision making, which is published elsewhere.(10)

4.2.3 Saturation

Code saturation is claimed for these interviews on the basis of the information weighting (IW) model presented by Lowe et al.(86) This method of determining code saturation relies on a number of numerical values determined as interviews are analyzed and are suited to the *a posteriori* analysis used in this study, where analysis occurred after the interviews were conducted. The information weighting model allows qualitative researchers to calculate the expected total number of codes and expected percentage saturation for a given population of known characteristics being interviewed. For example, as prescribers would generally have similar experiences determining why a patient was prescribed a medication from another prescriber, prescribers could be said to be part of a single population.

The twenty interviews were analyzed in a random order determined by a random number generator, and the following values were determined from the first three interviews in the randomized list:

Number of interviews considered for model, $N = 3$
Number of codes in first interview, $C_1 = 19$
Number of codes in the first three interviews, $C_3 = 23$
Number of total interviews available, $n_{int} = 20$

which, when entered into the IW model, resulted in:

Percentage saturation, $P = 0.98$
Estimated total number of codes , $C_{n,est} = 25$

The model estimated that 25 unique codes would be observed in the interviews, and a total of 25 codes were observed. As new codes were added to the code list, interviews were re-analyzed using the new codes. P and $C_{n,est}$ were calculated only after all of the interviews were analyzed, so that the results of the model would not influence new code creation. Based on this model, there are no new codes that could be observed from the data. Additionally, inductive thematic saturation was reached on the basis of no new codes being observed in the data.(81) While preparing the manuscript, the SRQR was followed.(82)

4.3 Results

Twenty prescribers (18 physicians, 2 nurse practitioner) were interviewed. Participants included the following specialties: 12 family medicine, 5 emergency medicine, and 1 anesthesiology. Additional information can be found in Table 3, and aggregated demographic information can be found in Table 4.

Most of the prescribers acknowledged that adding RFU onto their prescriptions would take additional time and result in some additional workload. However, the prescribers also generally acknowledged that there would be benefits to their clinical

practice. These aspects are captured in the following four themes: current practice; future practice; changing culture; and collaboration.

4.3.1 Theme 1: Current Practice

Throughout the interviews, prescribers were invited to comment on their current practice with respect to RFU, and how they thought pharmacists were currently determining and using RFU to dispense the prescribed medications. Most prescribers interviewed indicated that they do not generally add RFU onto prescriptions, with some exceptions. For example, one prescriber indicated that they add RFU in two situations:

> Mainly [adding RFU] for PRNs, more than likely for medications that might be a short-term use for a new indication. That might be the time you might [add the RFU]... or particularly with an older person. [Prescriber 04]

When asked to speculate on how pharmacists currently obtain RFU, the prescribers believed that pharmacists ask the patients, or guess. However, they repeatedly acknowledged that patients can be unreliable sources of information. The prescribers themselves acknowledged the dissonance between their expectation that pharmacists receive accurate RFU from patients, and their experiences with patients not understanding aspects of their own care:

> [Pharmacists] might ask the patient. Patients might not always know, we know that. … But certainly there's going to be a lot of confusion … I would imagine that most [pharmacists] have so much experience dealing with [prescribers] that

> they understand, probably, what's going on, but that's not a good explanation. [Prescriber 06]

This prescriber noted that pharmacists appear to be generally competent at using context and experience to determine the RFU. But as the prescriber noted, this is not a good replacement for clear interprofessional communication. While the prescribers generally believed pharmacists could benefit from the information, there was a concern that not all pharmacists would make good use of it:

> Large pharmacies like [national pharmacy chain], I don't think patients get a lot of counseling 'cause I think they're turning a lot of prescriptions, whereas my experience with smaller, community pharmacists is that the patients get a lot more information, and they get some information to help them understand why they were prescribed that medication. But I don't think it happens consistently. [Prescriber 10]

4.3.2 Theme 2: Future Practice

Prescribers were asked what they thought of adding RFU into region-wide drug database, such as an electronic health record or a drug profile viewer. They were generally supportive of allowing their colleagues to access information as to why a medication was prescribed.

> I don't know why [a medication's RFU] should be [a secret]. I think [having it in a regional database] would be good." [Prescriber 2]

But they were quick to note that having the opportunity to add context to the prescription would be beneficial.

> … having that free-form box would be useful because sometimes the diagnosis is not always clear, so you have room to say 'viral [upper respiratory infection] ruled out otitis media versus strep' something like that. [Prescriber 2]

The notion of saving time on call backs from pharmacists was cited by a number of prescribers as one of the greatest strengths of adding RFU, with the following quote reflecting the opinion of a number of prescribers:

> …[S]ometimes pharmacists send us notes back asking for clarifications, so there'll be time saved in not having those faxes of clarification. [Prescriber 10]

In general, prescribers were mostly in agreement that they did not need support in adding RFU to prescriptions, despite the increase in work. Some prescribers mentioned that since they already knew the indication, the only difference from current prescribing practice would be writing down what they were already thinking.

> I don't know why [prescribers] would need help to document the reason for use, because [they're] prescribing [the medication] for a reason. [Prescriber 9]

However, many prescribers were wary of the impact that adding this task would have on their overall workflow.

> The only concern I would have, is that it will just take an extra few minutes. [Prescriber 14]

Most prescribers who expressed concern about the impact of adding RFU on their workflow cited a similar issue: their concern with adding RFU is primarily in the cumulative time spent entering indications in their EMRs, which could take away from time spent with patients. As one prescriber described:

> …for meds that are being prescribed on a regular basis, once you put it in the EMR once, and you go to refill that med, it's gonna pop up, Reason for Use. So, it's just a little bit more work up front. But I think it would be worth the effort, ultimately, at the end of the day given the benefit. [Prescriber 14]

However, one prescriber in particular felt that the time required of prescribers to add RFU to every prescription would be too great, and that a targeted approach in adding RFU only in situations where clarification would be of high utility was suggested. Situations cited by the prescribers interviewed as benefiting from the addition of RFU, as well as those where RFU should not be added are presented in Table 5.

Table 5, When to add RFU according to prescriber participants

Add RFU	Do not add RFU
• Older adults • Antibiotics for paediatric patients • Polypharmacy • Unusual dose or indication • Persons who need supports to take medications • As needed (PRN) medications • Medications for acute conditions	• Treatment for sensitive illnesses (eg, STIs, psychiatric medications) • Adding RFU increases patient's anxiety • Could affect patient's likelihood of taking the medication • Off-label prescribing

4.3.3 Theme 3: Changing Culture

Prescribers readily admitted that their training did not make them aware of the value of passing along RFU to pharmacists, but most could identify potential benefits when asked. While the goal of this study was not to influence prescriber behaviour, the mere act of asking prescribers how this information could be useful to pharmacists encouraged a number to consider adopting this more collaborative practice.

> … I think it's a really good idea, and I never really thought about it and how important it is until today. May start doing it. [Prescriber 16]

In contrast to Prescriber 16, a different prescriber shared similar sentiment, but much more reservedly:

> I guess the one thing that would be important before going forward with making something mandatory, I feel like a lot of doctors get nervous, or they don't like hearing about more mandatory stuff. And I understand, again, death by a thousand cuts, so it would be important to make sure that doctors, maybe the [medical associations], or whoever is in charge of doctors, weighed in and really

> felt comfortable and felt like they were on board with adding more responsibility to what doctors do. But I do think overall it sounds like a good idea. [Prescriber 11]

Prescribers may feel that some aspect of their autonomy in prescribing may be threatened if the inclusion of RFU is mandated without appropriate consultation. While many prescribers welcomed the additional set of eyes verifying that the prescribed medication was correct for the specific indication, others were concerned that routinely providing RFU to pharmacists may cause interprofessional conflict and could ultimately result in patients not taking their medications:

> If the pharmacist disagrees [with my indication] then I really don't, as a physician, who has seen the patient and have spent some time with them, and have gone through their history; I would hate for that aspect of the care to be challenged and the patient not going on the medication… [Prescriber 19]

Prescribers also generally preferred the idea of a free text entry field for adding RFU, allowing them the flexibility to be precise in their documentation. Some of the prescribers mentioned the possibility of suggested RFU options within the EMR, integrated similar to an “autocomplete” function.

4.3.4 Theme 4: Collaboration

Prescribers were asked to comment on how listing RFU on prescriptions and medication containers would impact their relationships with other prescribers, pharmacists and patients.

With respect to their relationships with other prescribers, the prescribers interviewed noted that they would benefit from having ready access to RFU any time they had to understand why a patient was prescribed a particular medication (eg, after a visit to a different prescriber or when a prescriber takes over an existing practice). They also generally agreed that a regional EHR or a medication label was the best and most convenient place to store this information for easy access. Few prescribers noted that their relationship with other prescribers would be impacted, but they generally agreed that ensuring other prescribers had access to this information would facilitate communication across the healthcare team:

> I think it would enhance the relationship [between prescribers] because everyone is clearer and on board as to why you prescribed something for what reason. [Prescriber 10]

A small minority of prescribers noted that adding this information could lead to "judgement" [Prescribers 16, 19] from their colleagues. Specific cases that were noted included if the other prescriber is not used to an indication being written in a particular way, or if the other prescriber lacks some contextual information surrounding the prescription.

Prescribers were also asked to comment on whether it would be useful to have access to a patient's RFU for a medication when they did not prescribe it. They overwhelmingly had confidence in their ability to infer the prescriptions' indications based on the medication list.

> [When looking at a medication list] I probably don't need a lot of information [to determine RFU]. Cause I can look at the medication list and kinda understand what they're there for. [Prescriber 7]

With pharmacists, prescribers readily noted benefits such as an increase in bidirectional communication, supporting deprescribing, checking medication doses for a given indication to improve safety, improving counselling and patient education, and improving adherence. However, one prescriber expressed the following concern about the trustworthiness of pharmacies:

> I mean, the only, my only concern about that would be if that information is being used for commercial purposes... You know, like say someone comes into a [national pharmacy chain] with an STI. Is [national pharmacy chain] now going to target them with advertisements to get them to buy more condoms? [Prescriber 15]

This prescriber's concern reflects the importance of ensuring all parties understand how this information may be used, and the need to support patient confidentiality when sharing information between clinicians.

With regards to relationships with patients, prescribers tended to be either positive or ambivalent about the potential impact of adding RFU on prescriptions. All of the prescribers noted that they explain to patients why a particular medication was prescribed. Some prescribers noted that benefits may not be experienced by all patients when adding RFU:

> So, for some people, it may be a very helpful thing. It may help them to understand their medications a little bit better to make more informed users, I suppose. For others, it may just be not necessary information that they already knew. [Prescriber 4]

Others presented a view in light of their own experiences with the information patients know.

> I feel like writing something down gives the patients something concrete, because I often end up writing things down for them anyway, so this way they have it already on their prescription. I feel like it gives them something concrete that they can go Google when they get home. [Prescriber 11]

The prescribers all acknowledged that patients have the right to know why they were prescribed a given medication, and generally agreed that providing written RFU would support patients in understanding their medications.

4.4 Discussion

The prescribers interviewed were supportive of improving their communication with their pharmacist colleagues, especially because of the potential to support patient education and safety and to save time via reduced call backs about prescriptions. The potential increase in workload caused concern for most prescribers, but they did not feel they would need assistance in adding RFU to prescriptions. The few prescribers who currently add RFU to prescriptions tended to do so in limited circumstances, which seemed to be a palatable option for most prescribers. Prescribers' speculation that

pharmacists currently determine RFU by asking the patient, or by guessing is in agreement interviews that we conducted separately with pharmacists, and many participants empathized with the difficulty their pharmacy colleagues have in determining why a given medication was prescribed.(87)

Considerable research is being done to design electronic medical records that support indication-based prescribing. The work by Schiff et al., for example, is focused on having prescribers first identify the indication and then select from a list of recommended therapies.(9) This paper, however, focuses on whether that information should be shared with pharmacists. Most prescribers interviewed reported they had never considered the difficulty faced by pharmacists when dispensing a medication when they did not know why it was prescribed. To promote the routine addition of RFU to medication labels, the utility of RFU in ultimately saving the prescriber time as well as the benefits to their pharmacist colleagues should be emphasized to ensure maximal uptake of this burden on prescribers.(33,87)

Participants were asked to reflect on how their relationships with other prescribers, pharmacists and their patients would be impacted by the addition of RFU. Few prescribers focused on these professional relationships, but they highlighted that adding RFU would likely lead to improved communication with other prescribers and pharmacists. When sharing RFU with pharmacists, some of the prescribers expressed concern about possible interprofessional conflict that could result if a pharmacist is critical of a prescription, which has been found to be a considerable source of stress for

pharmacists.(43) While much of the RFU work has focused on time constrains, attention must be paid to the skills needed for interprofessional teamwork. In terms of relationships with patients, the value of leaving an appointment with a tangible document with their medication name and RFU included was noted, though the benefits may be lessened by the adoption of ePrescribing.(69)

Throughout the interviews, the prescribers highlighted a number of cases where adding RFU would be particularly beneficial. If adding RFU is to be implemented in routine practice, phasing in its use beginning with select populations or medications may help to highlight the value of this practice to prescribers, help clarify expectations for the parties involved, and provide valuable information to pharmacists.(87) Additionally, piloting the addition of RFU in select teams in a healthcare organization could both generate additional evidence for its value, but also promote more ready uptake of this prescribing practice.(88) Future work will focus on developing guidelines for when RFU should be added to prescriptions and medication labels, and consulting with communities who live with sensitive illnesses to determine what they would see as best practice for sharing the RFU for their medications on prescriptions and medication labels.

4.4.1 Limitations

This study sampled a limited number of prescribers in one geographic region in Canada, representing two types of prescribers (physicians and nurse practitioners) and

three medical specialties (family medicine, emergency medicine, and anesthesiology). Some practitioners in the specialties interviewed (eg, emergency medicine, anesthesiology) may not provide routine follow-up with patients, resulting in limited context regarding the impact of pharmacy practice on medication therapy management. Finally, gaining perspectives from other clinicians (eg, dentists, optometrists), including those providing treatment in inpatient settings, and in other locations would enhance the transferability of these findings.

4.4.2 Conclusion

This study highlights the aspects of RFU addition that may cause friction for its routine use, however it highlights a number of beliefs expressed by prescribers that should be used in implementation efforts. These results can be used to advocate for a staged rollout of RFU for select prescription classes/populations, and to support the implementation of new workflows such as indications-based prescribing. By keeping in mind the concerns of these prescribers as the push to routinely include RFU on prescriptions continues, increased interprofessional communication, increased patient understanding of their medications, and decreased harm from the use of medications can be achieved.

Chapter 5: How do I keep myself safe? Patient perspectives on including reason for use information on prescriptions and medication labels: a qualitative thematic analysis

5.1 Introduction

Medications are fundamental for the maintenance of good health and the treatment of disease in modern medicine. In Canada between 2007 and 2011, 41% of people living in the community between the ages of 6 and 79 took at least one medication, and around 30% of 65 to 79 year old people took 5 or more medications (ie, polypharmacy).(89) With adverse drug events causing more than 27,000 hospitalizations in Canada between 2010 and 2011, the safe prescribing and use of medications, as well as improving clinician-clinician and clinician-patient communication around medications represent key areas for health systems to facilitate safe medication use.(90) One such aspect is the addition of medication indications, also known as RFU, onto prescriptions and medication labels.

Patients are increasingly being asked to manage many aspects of their care, including communicating health information between healthcare providers and maintaining records of their own health.(42,55) Numerous studies have indicated that patients are sometimes unaware or incorrect about why they are taking a particular medication.(84,91) Adding RFU to medication labels would allow patients to always have RFU along with their medications and could improve adherence to prescribed medication treatments.(42)

Prescribers have identified barriers to the addition of RFU on medication labels, including the time required to add indications when writing a prescription, uncertainty of how to format the information, and being unsure of the value of adding RFU to prescriptions.(92) However, they acknowledged potential time savings in including RFU by pre-empting concerns from pharmacists.(92) From a pharmacy perspective, pharmacists have indicated that they would be able to more effectively carry out their clinical duties if provided RFU on a prescription and would ultimately benefit from being provided RFU on prescriptions, with previous studies determining that having access to RFU helped to nearly double the number of prescribing errors detected by pharmacists.(32)

Previous studies have investigated the perspectives of patients in adding RFU, many of which identified similar concerns to the prescribers and pharmacists above.(42) A systematic review on medication labels indicated that the labels facilitate communication and comprehension about medications by patients, and medication use errors may be caused by poor medication labels.(93) Additionally, medication labels designed to be more patient-friendly have been shown to improve adherence in patients with low literacy, as well as on medications that need to be taken two or more times per day.(75) Through these studies, however, a clear understanding of how patients themselves may use RFU was not determined. Thus, the objective of this paper is to describe patients' perspectives on the usefulness of adding RFU information to

prescriptions and prescription labels, and how they may use RFU to make decisions about their medications.

5.2 Methods

Semi-structured interviews were conducted with 20 community members who have used at least one medication in the last 30 days. Patients were recruited via flyers posted in public places, including the local university, doctor's offices and pharmacies. Patients were also recruited using an institutional database of older adults who indicated an interest in being contacted about research studies.(94) All participants were from Southwestern Ontario, and were interviewed at a time and place of their choosing. Semi-structured interviews allowed for flexibility on the part of the researchers to follow up on statements and themes mentioned by participants.(80) This study was approved by a University of Waterloo research ethics committee (ORE# 31591). Participants were asked questions about how they organize information about their medications, their comfort with having RFU communicated to pharmacies, and their thoughts on having medications' RFU on medication labels. A $25 CAD honourarium was given to participants in thanks for their time. Information on participants' demographics and number of medications can be found in Table 6.

Table 6, Demographic profile of patient participants

Demographic Type	Demographic Information
Age	Young Adult (15 to 24 years): 1 Adult (25 to 59 years): 7 Older adult (60+): 12
Number of medications	Minimum: 0 Average: 4.7 Maximum: 10 Mode: 3

5.2.1 Data collection

Interviews were conducted by two pharmacy and one systems design engineering researcher, using a semi-structured interview guide (Appendix E). This interview guide was developed by the pharmacy and systems design engineering teams, with input from patient partners. The interviews were recorded and transcribed.

5.2.2 Data analysis

NVivo for Mac was used to store and analyze the interviews.(79) Thematic analysis was used for the analysis, due to its flexibility in capturing both major themes and deviant cases across the interviews.(80) Pharmacy researchers CW and KG analyzed the first five interviews and developed a working code book. Differences in the codes created, as well as the codes applied in the specific interviews were resolved. CW and KG discussed codes and additions to the code book every subsequent 5 interviews analyzed. Codes were then organized into broader themes separately by CW and KG.

CW selected the final themes and codes in collaboration with KG, and a Framework Matrix was generated using NVivo 11 for Windows. The Matrix was used to select quotes for inclusion in the themes, where quotes expressing the majority's opinion as well as divergent cases were included. CW wrote memos throughout the interview analysis process to make note of key quotes and themes as they developed. Inductive thematic saturation is claimed on the basis of no new codes emerging.(81) The SRQR was followed during the preparation of this manuscript.(82)

Participants were also asked to participate in an activity to redesign a prescription label. Those results, as well as data from some of the interviews are published elsewhere.(11)

5.3 Results

Patients generally acknowledged the value of providing pharmacists with RFU and having RFU on prescription labels, while acknowledging that including RFU on a prescription label may pose a privacy risk.

5.3.1 Theme 1: Patient decision making with RFU

Patients framed their understanding of RFU as the reason a medication was prescribed (ie, to decrease my blood pressure), as opposed to what it was treating (ie, hypertension). The notion of prescribers explaining the rationale for a medication's use was reflected in patients valuing RFU in helping them make decisions regarding the use of the medication.

For example, patients might use RFU to know if they are using medications correctly.

> I would say that the biggest implication is not using it correctly. I know with the cream and with just some other things when I was trying migraine corrections, when I don't know why and I don't exactly know the "how" and the reason why it's important to take it at the same or anything, I would take it incorrectly and then it wouldn't have the desired effect. [Patient 006]

As well, others used RFU to make decisions regarding the continued use of a medication:

> Well, you would know how important it was. You wouldn't want to skip doses if it was something very vital. [Patient 012]

And to understand whether a medication was working:

> If your symptoms get worse, or your overall condition changes, you can kind of use your discretion on whether you should continue using it or not instead of having to go to the doctor each time. [Patient 005]

In all of these cases, providing RFU in an easily accessible manner would allow the patient to make more informed decisions about their care, and help differentiate medications if RFU was included on a label. One patient described how they currently draw symbols on their medication labels to tell them apart:

> … having a label that would say use this for this or this for that, would make sense to me to have that on it. I truthfully, when I'm getting prescriptions, I put

> them in my medicine cabinet and I will on my Luvox, my antidepressant, I put a happy face on it. Or on the Celebrex, I just mark on it bones. [Patient 020]

Additionally, having RFU on medication labels would also be helpful for instances where there is a change in the brand of medication dispensed. One patient described their frustration with medication information receipt as a way to organize RFU as follows:

> …over the years, the [drug store] changed, maybe to a different brand, and the name changes. So if I look at my original [medication slip] I don't know what the new ones are. [Patient 015]

Finally, patients appreciated that having RFU along with a medication name would allow them to learn additional information about their medication online:

> …when [my family doctor] gives me prescriptions he explains to me at the time why he is giving me something and what it should do for me. I then go online and look out to see what the side effects might be. [Patient 020]

5.3.2 Theme 2: RFU in modern, patient-centered care

Patients were asked to reflect on times they did not know the RFU for their medications. Some older participants recounted anecdotes like the following:

> When I was younger, the doctors just prescribed stuff and you accepted what they said without question. That was the mentality of the time, the doctor was this all-powerful all-knowing figure, and you were just the consumer of his services and you were expected to blindly accept what the doctor told you. [Patient 017]

In accordance with practices relating to patient-centered care, this mentality has shifted to acknowledging patients as partners in care. One participant, a retired nurse, succinctly described the value of RFU to patients:

> If [adding RFU] were to be implemented across the board, I think it would… give people the opportunity to ask the "whys" and it would give them opportunities to find out more about the medications they're on. [Patient 007]

When asked to rate the importance of receiving RFU from their prescriber, 19 of the 20 patients rated it at least a five out of five, with a number of patients rating the importance as more than five out of five. All of the patients interviewed expressed a desire to have a deeper level of understanding of their medications, for example understanding their physicians' decision-making process:

> Well, I want to know that my doctor understands why he's prescribing this drug. Whether he's prescribing it for its mainly intended use, or whether it's for an off-label use… I think patients these days want to be more proactive in their own healthcare. [Patient 017]

Patients were on-board with RFU being shared with pharmacists, and many reported receiving varying levels of counselling from their pharmacist, ranging from quick check-ins for repeat prescriptions, to yearly comprehensive medication reviews.

> I have no problem with [reason for use information being shared with my pharmacist on every prescription] because, to me, [both pharmacists and prescribers] are providing a professional service, and the more they're talking, the better… for everybody. [Patient 014]

Additionally, the majority of the patients reported that at least one family member was aware of why they were taking their medications.

> Well, I would think your husband or wife should know, and if your children are around, if they're adults they should know. But I don't think the whole world needs to know. [Patient 013]

All patients were able to note some benefits of adding RFU to medication labels. These included helping patients with polypharmacy manage their medications [Patient 007, 014], providing information to others in emergency situations [Patient 006, 010, 011, 015] and distinguishing medications from each other [Patient 001, 016]. Additionally, patients identified situations where other people are responsible for medication administration [Patient 013, 014, 017], and for older adults who need support [Patient 014, 019] as other times when having RFU on medications would be particularly valuable. Regarding emergencies, one of the participants shared the following:

> Well, I think in an emergency situation, it would be good for somebody if they saw [the RFU on my medication's label]. Especially if… they found it in my purse, then they would know, okay yeah, she's been taking this for X number of years. [Patient 011]

Inversely, patients also readily identified a number of potential disadvantages to adding RFU medication labels, including other people potentially seeing the RFU

[Patient 003]. This included including stigma surrounding STIs or psychiatric illnesses [Patient 007] illnesses one does not wish to disclose to others (ie, family) [Patient 013], and the potential for teenagers to bully each other as a result of RFU information [Patient 019].

5.3.3 Theme 3: Logistical aspects of communicating RFU

When asked, patients readily provided a number of methods they use to organize information related to their medications, Table 7. To organize their medications, most patients reported either keeping a list, or keeping the indications in their memory.

Table 7, Ways of organizing medication-related information

- A notebook with all medical-related information
- A list of medications (mentioned by a majority of patients)
    - one patient mentioned keeping it in their first-aid box
    - another, in triplicate, one with them, two at home
- Keeping the medication bottles in one place
- Remembering it (mentioned by a smaller number of patients)

When asked about the prospect of adding RFU to a medication label, the majority of participants agreed with the idea of adding RFU to medication labels. A number of patients specifically noted the value of adding the RFU close to where the directions are:

> I think it should be right under where the instructions are of how to take it. The average person doesn't want to know exactly the name of the prescription, they may not understand what the name of the drug is. [Patient 017]

Patients were asked how they wanted RFU to be presented in terms of the language used. Patients preferred that RFU be presented in a way that respects their knowledge and understanding of medications. For some patients, this meant lay language:

> Just tell me straight up… Just not technical stuff, not technical. [Patient 010]

And for others, more medical language:

> …I'm a public health major and I told [the doctors I am comfortable with medical language], so they were able to say, what is calcification and hypertension, and even words like ... embolization and embolization processes, 'cause it's one of the surgeries I could opt for. I know what that is, so they were very comfortable just using textbook words with me. [Patient 001]

Patients stated they expected that the RFU would be between one word to one sentence in length. “As brief as it could possibly be,” as Patient 018 put it.

When presented with the option of accessing information about their medications using a web-based system (eg, website, mobile app), patients had mixed feedback. One patient discussed their perception of how frustrating managing login information for different systems could be:

> …[if one system] connect[s] to hospital, I might use a [Medical Record Number], I might use a hospital ID, and it's usually not the same for each hospital. For me, with so many specialists at different hospitals, I could just imagine it being a mess. Maybe I use the wrong ID for the wrong hospital, then and I get frustrated. [Patient 001]

Similarly, a different patient was concerned with different pharmacies using proprietary systems that do not allow information to be transferred between pharmacies:

> The concern I have with an app is that because I have to move around occasionally as I'm not always convinced that the pharmacy will be connected to the right app. Then I'd have to have multiple apps so I find that a bit more burdensome…. unless [there] was a third-party system that all pharmacies were forced to be on I guess. [Patient 002]

Likewise, privacy concerns were raised by some participants who were afraid that their PHI would be accessed by unauthorized users:

> …because it's too easy to access by people who want to pry for nefarious reasons. [Patient 008]

However, the idea of using a web-based system to access information about medications was generally regarded as an attractive option, exemplified by this participant's viewpoint as an older adult:

> I think as the boomers age, more and more of that's going to be possible because we're becoming more and more tech savvy. And if I don't understand, I can ask my nine-year-old grandson who will tell me. [Patient 007]

5.4 Discussion

In the interviews, patients considered the RFU to be the rationale behind prescribing the drug. This information is useful for patients to help make decisions around medication use, such as knowing which medications would treat which symptoms, or determining when a medication could be stopped. Patients also felt that the RFU could them to help organize medication-related information, work with others such as family members to manage their medications or communicate with emergency medical personnel. In contrast, in prior research, pharmacists saw RFU as a tool to assess medication safety, and physicians saw it as a tool support interprofessional communication (ie, to decrease the number of clarifying calls from pharmacy), and to provide transparency around why a drug is prescribed.(87,92) Of note, no singular terminology or definition (ie, indication vs RFU) about what a clinical indication is or what information it needs to carry exists.(9) Indications listed on medication bottles should facilitate use by patients for decision making, as well as being of utility for clinicians to facilitate information transfer. However, like the pharmacists and physicians interviewed previously, the patients interviewed expressed concerns about privacy if someone saw RFU on a prescription label.(87,92)

Many of the older participants noted that how their physician communicates with them has changed over time, representing a shift to patient-centered care. Communicating RFU represents a change in how information was communicates previously.(95) However, given the gap between clinicians' and patients' understanding

of what RFU is, clinicians will need to work alongside patients to ensure that when a medication is prescribed, information pertaining to both the symptoms and diagnosis are communicated clearly to patients. Increasing the accessibility of RFU is complimentary to current patient medication safety initiatives, including Canadian Patient Safety Institute's *#ConquerSilence* and *Five Questions to Ask about your Medications* campaigns to increase transparency and information sharing about medications.(57–59) Additionally, it directly aligns with a number of guidelines from the Institute for Safe Medication Practices, including their *Guidelines for Standard Order Sets,* and published strategies to mitigate errors associated with look- and sound-alike medications.(96–98)

Patient participants generally agreed that using lay language to communicate RFU information would be preferable to medical language, which aligns with existing work in this area.(42) Additionally, all participants were able to determine a situation in which having RFU written on medication labels would be valuable. Many of these were situations were where the RFU would be interpreted by a third party, and in a number of the cases, a person without medical training. Given this context, writing RFU in lay language on medication labels would provide the most utility in the broadest number of situations, allowing patients, family members and others to understand what a particular medication is for, and for clinicians to interpret the indication accurately.

The idea of having a patient-facing website or app was also attractive to most participants, so long as it was straightforward to access. Many participants reported

they currently use lists to manage their medications; a patient website or app is similar, just in a digital format. Reducing friction in the sign-in process could help facilitate the adoption and uptake of a website or portal for patients' use but would not accomplish all of the goals of having RFU written on medication bottles, especially to allow others to determine RFU.

Extensive work has been conducted in the area of RFU improving safety, like the work of Bosch-Lenders recommending the addition of RFU on medication labels to support older adults safely using medications, and to improve patient adherence.(42,99) The latter study by Garada, Schiff et al. involved researchers interviewing patients regarding the use of putting RFU on medication labels indications as well. Additional work by Schiff et al. has examined the addition of medication indications via "indications-based" prescribing to allow for easier and faster addition of medication indications, to enhance medication safety and to improve clinician communication.(18,42,53) This paper builds on their existing work by highlighting some additional benefits to adding RFU on medication labels, such as keeping track of medication despite changes in brand or packaging and the value in having RFU on medications in emergency situations. Additionally, the patients interviewed described using RFU to support decision making regarding their medications, as opposed to serving as a reminder to take a medication.

5.4.1 Limitations

While participants were varied in gender, age and understanding of their medications, they were all from a single geographic region in a publicly funded healthcare system. The findings may be different in other areas. Currently, patients in this region lack electronic access to their own healthcare records (ie, via a patient portal). These patients may thus lack an understanding of how these systems could benefit them, however the role that communicating RFU in could play benefiting them is universal. Additionally, patients volunteered to participate in this study, leading to a potentially biased sample who may have a stronger understanding of their medications than the general population.

5.4.2 Conclusion

This study demonstrated the value of RFU for patients and explores a number of ways it could be effectively communicated, with respect to both format and delivery method. These results can be used to advocate for patients to have access to RFU on their medication labels, to help patients make decisions about taking their medications, and could improve patient adherence with prescribed medications. By keeping in mind the diverse group of people who may ultimately need to learn a medications' RFU from its label, prescribers and pharmacists should ensure that the RFU information included is understandable by a wide range of people.

Chapter 6: Conclusion and Future Work

The analyses of the interviews presented indicate the value of adding RFU to prescriptions and medication labels to pharmacists, prescribers and patients. Additionally, improvements to interprofessional communication and patient counselling could be realized by ensuring pharmacists and patients are aware of medications' RFU. This has the potential to ultimately improve interprofessional communication and patient safety.

Ensuring the addition of RFU as a matter of course on prescriptions and medication labels will require collaboration by a number of stakeholders before it becomes commonplace. This thesis demonstrates the value of continued engagement with prescribers to promote the addition of RFU on prescriptions to support pharmacist collaboration. This may take the form of engaging with regulatory bodies, interest groups or even individual prescribers for a more grassroots approach.(41) Research and practice still needs to happen to ultimately illustrate the benefits of adding RFU to prescribers by demonstrating tangible time saving, such as a decrease in callbacks.

Additional research needs to be conducted to determine the time saved by prescribers on callbacks if RFU is added, as well as improvements in patient understanding of their medications as well as patient adherence to prescribed treatment regimens. Further, research must be completed learn the perspectives of

people living with an STI, the human immunodeficiency virus (HIV) or acquired immune deficiency syndrome (AIDS), and/or mental health illnesses, to best determine how to communicate and label information with regards to those conditions. Ensuring that the inclusion of RFU is considerate of people no matter their circumstances is important to make sure patients feel respected, and is reflective of patient-centered care.

As Canada's *PrescribeIT*® system continues to be rolled out, opportunities to promote the clear communication of information around prescriptions present themselves. These should include incorporating initiatives like Schiff's indications-based prescribing, improving medication labels to be more useful to patients, and requiring that RFU is included on prescriptions.(11,31) These charges will take time but can be aided by legislation put forward by individual provinces and territories, or federally, potentially as a component of a national pharmacare rollout. There are many changes happening in the areas of medication management, legislation, and health information technology, which should be seen as an opportunity to help Canadians stay safe and healthy.

Appendix A: Survey Faxed to Pharmacists

Fax to return to: 519-883-7580
Attention: Kelly Grindrod (University of Waterloo School of Pharmacy)

SURVEY QUESTIONS FOR PHARMACISTS

We are looking at how information about a patient's reason for using a medication is shared between patients, pharmacists, and physicians. To answer the following questions, think about your own practice.

Note: *When we say "reason for use", we are referring to the reason a medication was prescribed. This is also commonly called the "indication for treatment". For example, for hydrochlorothiazide, the reason for use may be hypertension.*

#	PHARMACIST Questions

1. How often do you see a reason for use included on a prescription sent to you by a prescriber?
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always

2. Based on your experience, what proportion of physicians would be willing to share the "reason for use" with the pharmacist?
    - None
    - A Few
    - Half
    - Most
    - All

3. If the prescription included the "reason for use", would you be willing to include it on the patient's medication label?
    - Yes
    - No
    - It depends (please explain)

4. If the prescription included the “reason for use”, do you think pharmacists should record it into a region-wide drug record such as ClinicalConnect or the Ontario Drug Benefit Profile Viewer?
    - Yes
    - No

5. How beneficial would it be for you to have access to "reason to use" information directly from the physician?
    - Not at all
    - A little
    - Somewhat
    - Quite a bit
    - A great deal

6. How strongly do you agree/disagree that patients should have access to “reason for use” for their prescriptions?
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree

Would you be willing to participate in a 1-hour interview? We will provide $150 in appreciation of your time at the end of the interview. Please indicate your choice below.

- Yes, I would be interested in participating in a 1-hour interview to discuss this further.

  Name:
  Phone:
  Email:

- No, I would not be interested.

Appendix B: Interview Questions for Pharmacists

We are looking at how information about a patient's reason for using a medication is shared between patients, pharmacists, and physicians. To answer the following questions, think about your own practice.

Note: *When we say "reason for use", we are referring to the reason a medication was prescribed. This is also commonly called the "indication for treatment". For example, for hydrochlorothiazide, the reason for use may be hypertension.*

1. What is your gender?
    - Man
    - Woman
    - Non-binary
2. How many years of experience as a pharmacist do you have?
3. What type of pharmacy do you work at?
    - Independent
    - Chain store
    - Family health team
    - Other:

4. What is the computer system you use?

5. Have you used other computer systems, besides which you currently use?
    - Yes
    - No
        - Which one(s)?
        - Which ones do you feel most comfortable with?
        - Why?

We are going to talk about your experiences with the use of the system you currently use.

1. How often do you see a "reason for use" included on a prescription sent to you by a prescriber?
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always

2. Based on your experience, what proportion of physicians would be willing to share the "reason for use" with the pharmacist?
    - None
    - A Few
    - Half
    - Most
    - All

3. Think back to the past week. Describe how you typically identified the reason medications were being prescribed?
    - Potential probes:
        - Do you ask the patient?
        - Do you verify your assumptions with the patient?

4. How effective are pharmacists at determining the "reason for use" by reviewing the prescription (without asking the patient or physician)?
    - Not too much
    - A little
    - Somewhat
    - Quite a bit
    - Very much

5. Some exploratory research found that pharmacists are incorrect about 1 in 10 times when determining the "reason for use". Does that surprise you?
    - Yes
    - No
        - If yes, why?
        - If no, why not?

6. Describe what you do with "reason for use" information?

7. Is the "reason for use" documented?
    - Yes
    - No
    - It depends (please explain)
        - Who is it shared with?
            - Patients
            - Physicians
            - Others (who are they?)

8. Who has access to the reason to use information?

9. Do you ever place the “reason for use” on prescription labels for patients?
    - Yes
    - No
    - It depends
        - If yes, when do you decide to do this?

10. Think back to the last month, when you were filling prescriptions for patients, how would they know the reason the drug was being prescribed?
    - What do you tell your patients about the reason you are dispensing a medication?

11. If the prescription included the “reason for use”, would you be willing to include it on the patient’s medication label?
    - Yes
    - No
    - It depends (please explain)

12. If the prescription included the “reason for use”, do you think pharmacists should record it into a region-wide drug record such as *ClinicalConnect* or the *Ontario Drug Benefit Profile Viewer*?
    - Yes
    - No

13. How beneficial would it be for you to have access to "reason to use" information directly from the physician?
    - Not at all
    - A little
    - Somewhat
    - Quite a bit
    - A great deal
        - If your answer was no, can you tell us why?
        - If your answer was yes, what are those foreseeable advantages?

14. How strongly do you agree/disagree that patients should have access to “reason for use” for their prescriptions?
    - Strongly Disagree
    - Disagree
    - Neutral

- Agree
- Strongly Agree

15. Over the last week, describe how you monitored drug therapy in your patients?

16. What does "monitor drug therapy" mean to you?

17. Over the last week, describe how did you typically assess the safety of prescribed medications? Efficacy? Adherence?

18. Describe your relationship with your patients.

We are going to talk about would happen if the "reason to use" was added to the current system.

1. Over the last week, can you describe a time when you could have used this information?
    - Yes
    - No

2. If you had access to a reason for use, what level of detail would you need?
    - Just the reason for use
    - The reason for use and more background behind it
        - If you choose second choice, explain (e.g., lab test values or diagnostic reasoning?)

3. What should the "reason for use" information that you get look like? (please explain)
    - In what section of the system should this information be presented?
    - How should it be shared?

4. If a diagnostic code (e.g., ICD-9 codes) was added to the prescription, would that be good enough?
    - Yes
    - No
    - It depends
        - [If the pharmacist isn't aware of what an ICD-9 code is, physicians often code a diagnosis in their computer system using a system such as ICD-9. The code is used to track information about the patient and to bill for their services. The ICD-9 code includes a 5-

digit number and the name of the diagnosis such as 530.81 Gastroesophageal reflux.]

5. Would you prefer that the prescriber type the diagnosis onto the prescription rather than using a pre-set code?
    - Yes
    - No
    - It depends

6. How detailed would you expect the typed "reason for use" to be?
    - A few words
    - One sentence
    - Couple sentences

7. How variable would you expect a free form typed "reason for use" to be?
    - Not at all
    - A little
    - Somewhat
    - Quite a bit
    - A great deal

8. Do you think prescribers would need help documenting the "reason for use" on prescriptions?
    - Yes
    - No

9. If the "reason for use" is being communicated to the patient, what type of language should be used?
    - Lay terms
    - Medical terms

10. When a medication is initially prescribed, who should be responsible for translating the "reason to use" information into lay language for the patient?
    - Pharmacist
    - Physicians
    - Both

11. Who else should have access to reason for use information?

12. Do you have concerns about the sharing of reason for use information with pharmacists or others on the care team?
    - Yes
    - No
    - It depends

13. Does the "reason for use" solve anything?
    - Yes
    - No
        - Why?
        - How would it change your practice?

14. Do you have any final comments or concerns?

Appendix C: Interview Questions for Physicians and Nurse Practitioners

1. What is your gender?
    - Man
    - Woman
    - Non-binary

2. How many years have you been a physician or a nurse practitioner for? __

3. Are you a family doctor?
    - Yes
    - No
        - If no, what is your medical specialty

4. What type of practice do you have?
    - Independent
    - Family health organization
    - Family health team
    - Other

5. What is the electronic medical record (EMR) system you use in your office?

6. Have you used other EMR systems, besides which you currently use?
    - Yes
    - No
        - If you do, which one(s)?
        - With which one do you feel most comfortable?
        - Why?

We are going to talk about your experiences in the use of the current system.

1. How often do you enter reason to use information into the computer when you are writing your prescriptions?
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always
        - If you do, who sees the reason for use information that you record?

2. When you were writing prescriptions, did you ever record the "reason for use" in your EMR?
    - If yes, how?
    - If no, why not?

3. Did you ever include it on the prescription?
    - Yes
    - No
    - It depends

4. Would you be willing to share reason for use with the pharmacist?
    - Yes
    - No

5. Do pharmacists need to know the "reason for use" for a prescription?
    - Yes
    - No
    - It depends
        - If yes, how?
        - If no, why not?

6. If the reason for use wasn't given to a pharmacist, describe how you think a pharmacist identifies the "reason for use" of a medication?

7. Describe what you think a pharmacist could do with "reason for use" information?

8. Would you be willing to have the reason for use printed on the patient's medication label?
    - Yes
    - No
    - It depends

9. Would you be willing to have the reason for use shared on a region-wide drug record such as *ClinicalConnect* or the *Ontario Drug Benefit Profile Viewer*?
    - Yes
    - No
    - It depends
        - Why / why not?

10. If you knew other healthcare providers were going to see the reason for use for the medications you prescribe, would you write the "reason for use" in a different way than you would for your own records?
    - Yes
    - No
        - **If yes**, how would it be different?

11. How beneficial would it be for you to share the "reason to use" with pharmacists and patients?
    - Not at all
    - A little
    - Somewhat
    - Quite a bit
    - A great deal
        - If your answer were no, can you tell us why?
        - If your answer was yes, what are those foreseeable advantages in each case (with other physicians, the pharmacist, and the patient)?

12. How strongly do you agree/disagree that patients should have access to "reason for use" for their prescriptions?
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree

13. Do you have any concerns about adding "reason for use" to prescriptions?
    - Yes
    - No
    - It depends (please explain)

14. Think back to the last month, when you were writing prescriptions for patients, how would they know the reason the drug was being prescribed? What do you tell your patients about the reason you are prescribing a medication?

We are going to talk about would happen if the "reason to use" it is added to the current system.

1. Imagine yourself in a situation where you are treating a new patient. You are looking at their medication list. How much information about the "reason for use" would you need to be able to renew their old medications?
    a. Diagnostic codes (e.g., ICD-9 codes)?
        - Yes
        - No
        - It depends
    b. Free form notes?
        - Short answer (less than a sentence)
        - Long answer (more than a sentence)
    c. Would physicians need help to document the "reason for use" on prescriptions?
        - Yes
        - No

2. What is the easiest way to share "reason for use" information with pharmacists and other physicians outside of your workplace?

3. If the "reason for use" was added to the prescription, what type of language should be used?
    - Lay terms
    - Medical terms

4. When a medication is initially prescribed, who should be responsible for translating the "reason to use" information into lay language for to the patient?
    - Physician
    - Pharmacist
    - Both

5. How do you envision yourself including reason to use information on a prescription if it was mandatory?

6. How would it affect your workflow? What would be good? What would you worry about?

7. How would mandatory reason to use information influence your relationship with your patients? With other physicians? With pharmacists?

8. Do you have any final thoughts?
   Would you suggest any colleagues who may be willing to speak with us?

Appendix D: Standards for Reporting Qualitative Research Checklist

Note: this checklist was completed for the research in all of Chapters 3, 4 and 5. Only one completed checklist is included here.

Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

Title and abstract	**Page/line no(s).**
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	Y
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	Y

Introduction	**Page/line no(s).**
Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	Y
Purpose or research question - Purpose of the study and specific objectives or questions	Y

Methods	**Page/line no(s).**
Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	Y

Methods (continued)	Page/line no(s).
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	Y
Context - Setting/site and salient contextual factors; rationale**	Y
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	Y
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	Y
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	Y
Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Y
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	Y
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Y
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Y
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Y

Results/findings	Page/line no(s).
Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Y
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Y

Discussion	Page/line no(s).
Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Y
Limitations - Trustworthiness and limitations of findings	Y

Other	Page/line no(s).
Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Y
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Y

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: 10.1097/ACM.0000000000000388

Appendix E Interview Questions for Patients

Note: some questions were asked as a part of a Prescription Label Design Workshop by Hussein et al.

First, we are going to ask you a few questions about yourself.

Demographic questions:

1. What is your age?

2. What is your gender?
    a. Man
    b. Woman
    c. Non-binary

Questions related to your medication history

1. How many medications do you take regularly?
2. In the last month, can you tell me what medications you took and why you took each of your medications?
3. Do you keep any lists of these medications (in a file, on a computer, etc.)?

4. Would you be comfortable with us taking a picture of these records? We will ensure that all identifying information is kept confidential and protected.

We are going to talk about how you interact with the current system. In particular we are interested in something called "reason for use". This is the reason a medication was prescribed to you. For example, the reason for use with Tylenol may be "a headache" our "arthritis pain".

Questions related to how you function in the current system:

1. How do you currently find out what your medications are for?

2. Where do you place this information? (Potential probes: Do you write it down? Do you keep it put in your phone? Do you make medication lists?)

3. In the past, has the reason for use information been shared with you?
    a. Who shared this type of info with you? Pharmacist? Physician?

b. When did they share it? Did you have to ask to find out or was this info provided?

c. Please provide an example of what type of language was used to explain a medication. How useful was this?

d. Was there a time that the reason for using a medication a professional provided was not clear or useful? Please explain.

e. Can you recall a time that learning the reason for using a medication was particularly helpful for you? Please tell me more.

4. Who else is aware of the reasons you are taking your medications?

5. Can you recall a time when you did not know the reason for a medication? What implications did this have?

    a. What did you do to find out (if appropriate to ask)? (ask user to draw out the steps they took to find out the reason for use information)

6. On a scale of 1 to 5, with 5 being "very important," how important is it for you to know what your medication are for? Please tell us more.

We are going to talk about what would happen if the "reason to use" was added to the computer systems that doctors, pharmacists, and nurses use to help you manage your medications.

<u>Questions related to being provided with "reason to use" information:</u>

1. How would you feel if the reason for use was shared with your pharmacist on every prescription, including refills?

2. How should the reason for use information be presented to you? (Probing questions: Would you like it to be on your prescriptions? Receipts? Medication lists? In an app or website that you use to view or access your prescriptions?)

3. How would the reason for use information affect your ability to make decisions about your medications?

4. Who else should have access to your reason for use information? This can be anyone in your life such as healthcare professionals, care providers, or family members. Why?

Prescription Label Design Workshop

Now we are going to design a prescription label that would hypothetically incorporate the "reason to use" information. (Hand participant example prescription label template)

Place an 'X' where you would want to see "reason to use" information.

Follow-up Questions:

1. Why did you choose this location?

2. How much detail would you expect? (Potential probes: Short-hand? Long-hand?)

3. If you could rearrange the information on this prescription label, would you?
    a. If yes, please show us. (Hand participant blank prescription label template, corresponding prescription label information, and tape)
    b. Why did you choose the layout you did?

4. Do you have any concerns regarding the sharing of reason for use information with the pharmacist or on your prescription labels? If so, what?

5. On what occasion(s) would you like this information on your prescription label?

6. On what occasion(s) would you not like this information on your prescription label?
    a. (if they acknowledge privacy concern) How you suggest affording privacy concerns?

7. Do you prefer the phrase ‘reason to use’ or ‘reason for use’?

8. Who do you think would benefit from this new design?

9. How will you use this new design?

10. Does this adding reason to prescription labels solve the problem we’re trying to solve?

11. How might we think about this design differently?

12. Is there any other way to accomplish this design problem?

13. What do you believe is the end result of doing this?

14. Do you have any final thoughts, comments, or concerns?

15. On a scale of one to 5, how much do you depend on your prescription label for proper medication management and/or knowledge?

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